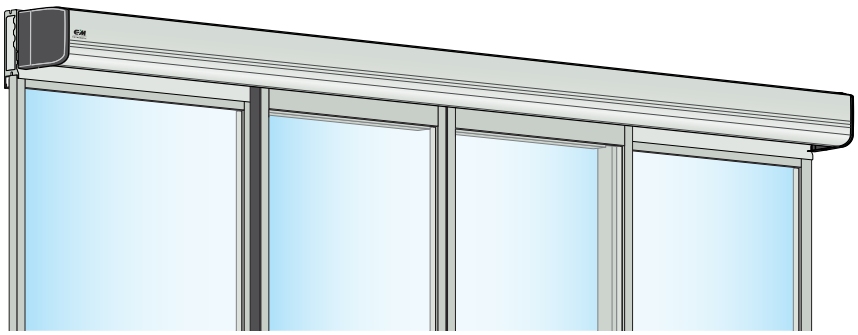
ENTREMATIC

Entrematic Sliding Door Operator EMSL



Installation and Service Manual - Original instructions

1004572-EMEI-5.0 – Issue 2012-08-23

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1 Revision

Following pages have been revised:

Page	Revision 4.0 → 5.0
5	Module text updates
11	Updated illustration - PS-6 programme selector added
25	Item 3b) “Connect the cable..” deleted.
31	Updated illustration - new programme selectors
34	New Note! added
35	Minor text change - non-monitored added
36	New sentence; “A battery will also be detected..” added. Text update; “..and also detect an eventual expansion unit.” added
38	Section “Programme selectors and functions” updated with new text and illustrations.
39	PS-6 added
42	Two new sentences added in 14.2.5 Emergency Unit Error.
43	New row added.
48	Text change; “..with batteries” added New item; “Electrical emergency unit with batteries and two motors” added Text change; “..with elastic cord” added Drawing references added Text change in section “Electrical emergency unit with batteries”.

2 Important information

HAZARD WARNING!

Failure to observe the information in this manual may result in personal injury or damage to equipment.

Save these instructions for future reference.

2.1 Intended use

The Entrematic EMSL is an automatic sliding door operator developed to facilitate entrances to buildings and within buildings through sliding doors.

The Entrematic EMSL is designed to be surface-mounted to the wall or a beam. It is easy to install for both new construction and retrofit application, and it can be adapted to a wide range of door requirements. It is to be installed indoors where it is suitable for almost all types of external and internal sliding doors.

A Entrematic EMSL operator can be combined with the full range of Entrematic safety units, such as presence and motion sensors.

The door operator is designed to offer continuous use, a high degree of safety and maximum lifetime.

For use see User manual 1005274.

2.2 Safety precautions

Do not climb on door parts.

Do not let children play with the door or the fixed controls.

Keep remote controls away from children.

To avoid bodily injury, material damage and malfunction of the product, the instructions contained in this manual must be strictly observed during installation, adjustment, repairs and service etc. Training is needed to carry out these tasks safely. Only Entrematic-trained technicians should be allowed to carry out these operations.

2.3 Electronic equipment reception interference

The equipment complies with the European EMC directive (US market FCC Part 15), provided installed according to Installation and Service manual.

The equipment may generate and use radio frequency energy and if not installed and used properly, it may cause interference to radio, television reception or other radio frequency type systems.

If other equipment does not fully comply with immunity requirements interference may occur. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined

by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient the receiving antenna.
- Relocate the receiver with respect to the equipment.
- Move the receiver away from the equipment.
- Plug the receiver into a different outlet so that equipment and receiver are on different branch circuits.
- Check that protective earth (PE) is connected.

If necessary, the user should consult the dealer or an experienced electronic technician for additional suggestions.

2.4 Environmental requirements

Please act according to your local regulations and dispose of your unused product(s) and packaging properly. The correct disposal will help prevent potential negative consequences for the environment and human health.

Entrematic products are equipped with electronics and may also be equipped with batteries containing materials which are hazardous to the environment. Remove this material from the operator before it is scrapped and make sure that it is disposed of properly as was done with the packaging.

This manual contains the necessary details and instructions for the installation, maintenance and service of the Sliding Door Operator Entrematic EMSL.

3 Design and function description

Design

The sliding door operator Entrematic EMSL works electromechanically. The motor, control unit, transmission – and optional emergency unit and electromechanical locking device – are all assembled in a support beam with an integrated cover. The motor and gear box transmit movement to the door leaves by means of a tooth belt. The door leaf is fitted to a door adapter/carriage wheel fitting and hangs on a sliding track. Movement of the bottom of the door leaf is controlled by the floor guides.

3.1 Function

Opening
When an OPENING IMPULSE is received by the control unit the motor starts and transmits movement to the door leaves, which move to the open position.

Closing
The closing starts when no OPENING IMPULSE is received and the HOLD OPEN TIME has run out.

3.2 Safety functions integrated in the operator

To permit safe passage between closing doors, the doors immediately reverse if an obstruction is detected, then resume their interrupted movement at low speed to check whether the obstruction has disappeared or not. If an obstruction is detected between opening doors and surrounding walls or interior fittings, the doors immediately stop and then close after a time delay.

3.3 Microprocessor for precise control

The microprocessor has a routine for self-monitoring, which detects any interference or faulty signals in door operation. If an input signal does not correspond to the preprogramming, the microprocessor automatically takes necessary actions to ensure safe door operation.

3.4 Emergency escape

The Entrematic EMSL can be combined with an emergency unit that automatically opens or closes[1] the doors in the event of a power failure and can also be interfaced with the fire alarm or smoke detector. Safety can be further reinforced by incorporating a break-out fitting. This enables the doors and side screens to swing outwards in an emergency situation by applying a defined pressure at the front edge.

Doors used for emergency escape in buildings such as hospitals and homes for elderly people may not be locked or put in programme selection OFF.

[1] Electrical emergency unit only

4 Technical specification

Manufacturer:	Entrematic Sweden AB
Address:	Lodjursgatan 2, SE-261 25 Landskrona, Sweden
Type:	EMSL
Mains power supply:	120 - 240 V AC 50/60 Hz, mains fuse max 10A **Note!** The mains power supply shall be installed with protection and an all-pole mains switch with isolating capability of Category III, at least 3 mm between contacts, shall be installed according to local regulations. These articles are not provided with the door.
Power consumption:	Max. 250 W
Degree of protection:	IP20
Degree of protection, control actuators:	IP54
Auxiliary voltage:	24 V DC, 640 mA
Recommended max. door weight:	EMSL-2 100 kg/leaf EMSL-1 200 kg
Clear opening:	EMSL-2: 900 – 2400 mm (optional up to 2800 mm) EMSL-1: 900 – 2000 mm (optional up to 2800 mm)
Opening and closing speed:	Variable up to approx. 1.4m/s (EMSL-2)
Hold open time:	0-60 s
Ambient temperature:	-20 °C to +50 °C
Relative humidity (non-condensing):	Max. 85%
Approvals:	Third party approvals from established certification organizations valid for safety in use and escape route safety. For details see Declaration of Conformity.
For indoor use only	

Classification to DIN 18650-1							
Digit 1	Digit 2	Digit 3	Digit 4	Digit 5	Digit 6	Digit 7	Digit 8
2	3	2	0	1,2,3	1,2	1,2,4	4

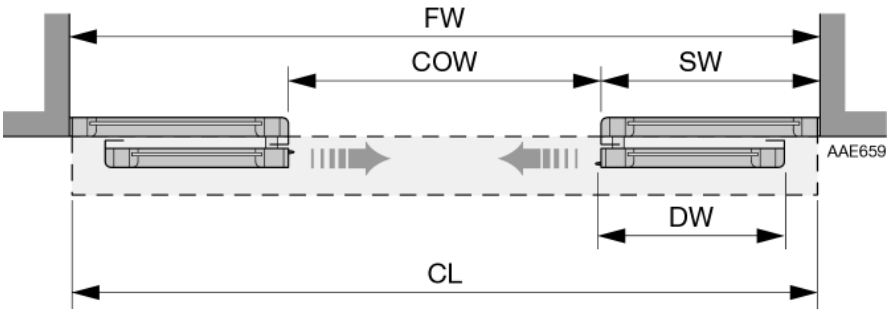
Type of drive, digit 1.	2	sliding door drive
Drive durability, digit 2.	3	1 000 000 test cycles, at 4 000 cycles/day
Type of door leaf, digit 3.	2	sliding door
Suitability for use as a fire protection door, digit. 4	0	not suitable for use as a fire protection door
Drive safety devices, digit 5.	1	force limitation
	2	connection for external safety systems
	3	low energy
Special requirements for drives/functions/fittings, digit 6.	1	in escape routes with a break-out system
	2	in escape routes without a break-out system
Safety at door leaf or leaves, digit 7	1	with sufficiently dimensioned safety distances
	2	with protection to prevent fingers being crushed, shorn off or drawn in
	4	with presence sensor
Ambient temperature, digit 8	4	temperature range as specified by the manufacturer

5 Models

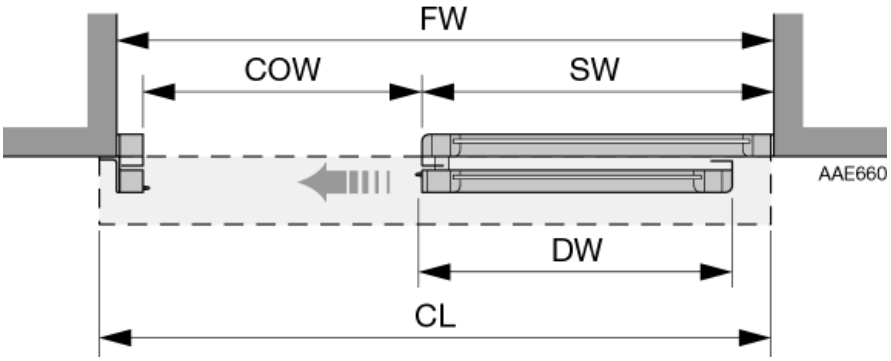
Two main models are available:

- **EMSL–2**; for bi-parting doors, consisting of a pair of door leaves which are sliding away from each other to form a common door opening.
- **EMSL–1**; for single sliding doors with one **right** or **left opening** door leaf.

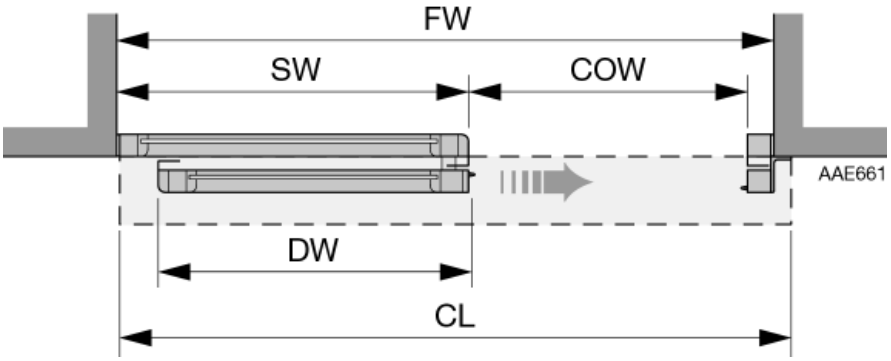
EMSL–2 (bi-parting)



EMSL–1 (single sliding, right opening)



EMSL–1 (single sliding, left opening)



FW = Frame width

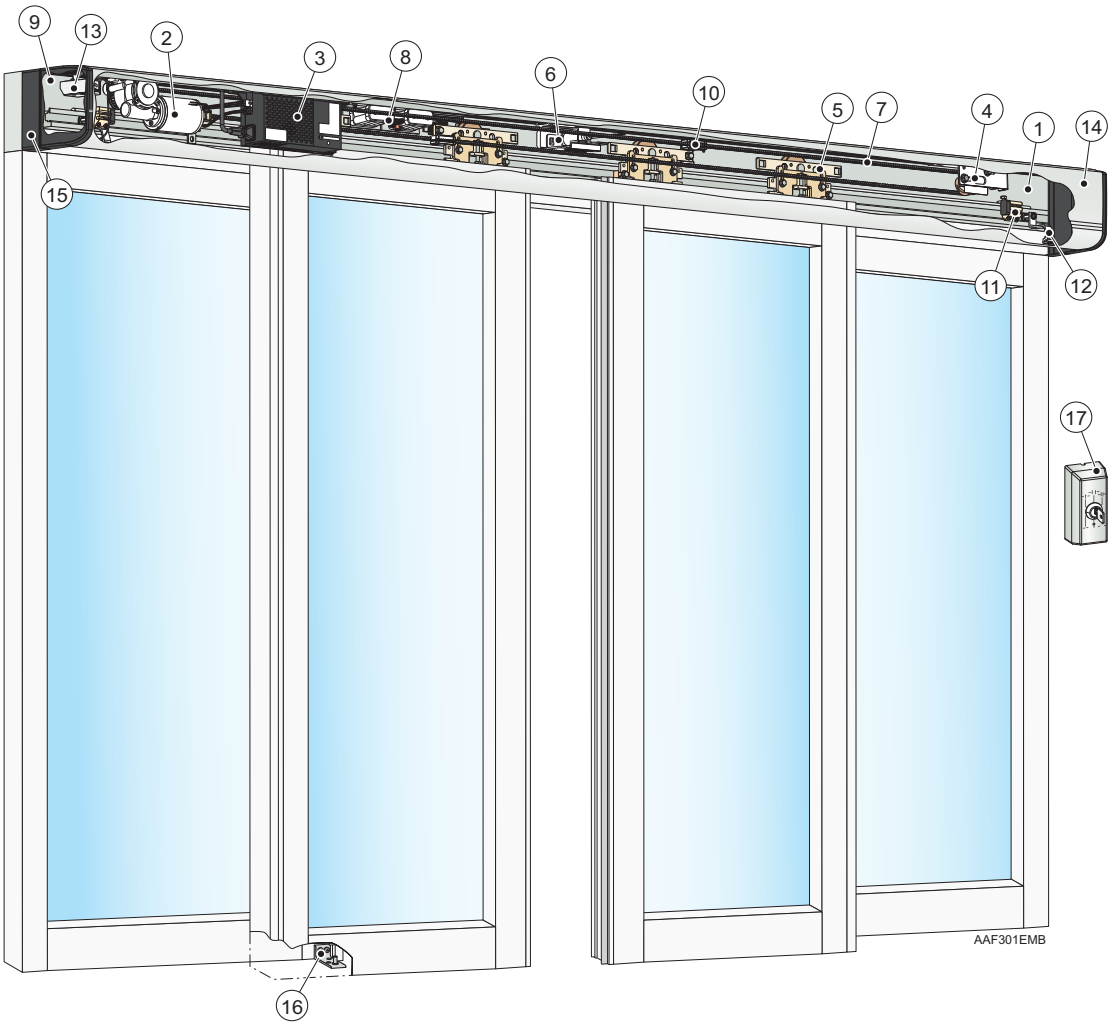
CL = Cover length (incl. end plates 2 x 30 mm)

COW = Clear opening width

SW = Side screen width

DW = Door leaf width

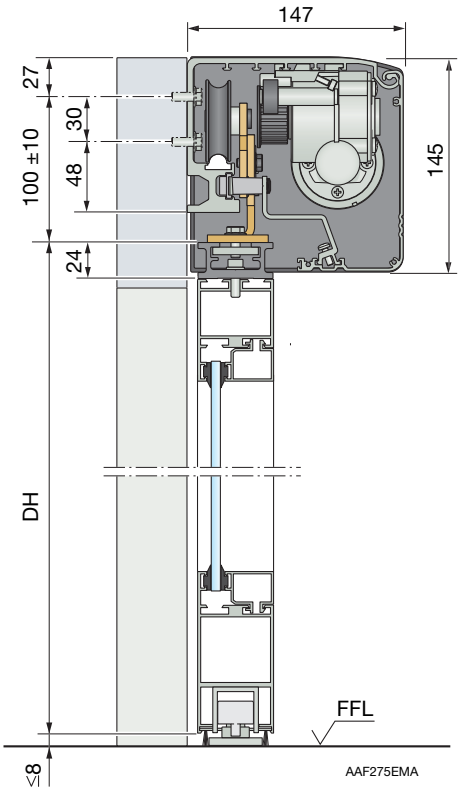
6 Identification



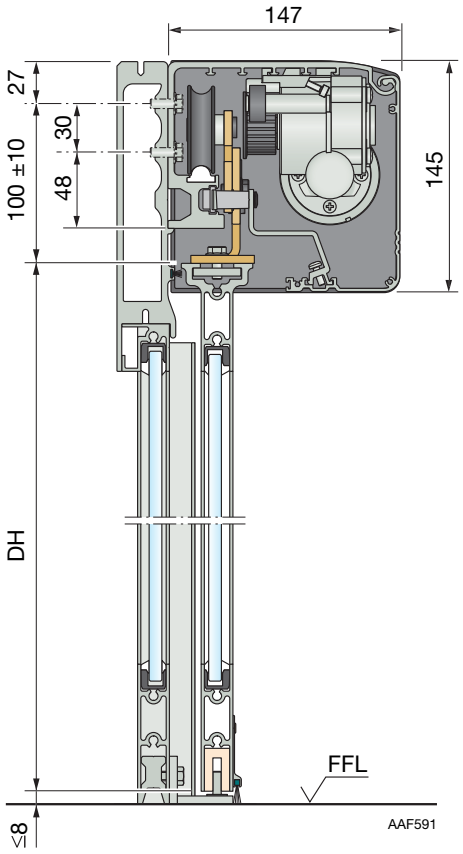
No.	Description	No.	Description
1	Support beam	10	Tooth belt fitting
2	Drive unit	11	Door stop
3	Control unit	12	Cover lock
4	Tension wheel	13	Mains power connection block
5	Carriage wheel fitting	14	Cover
6	Locking device (option)	15	End plate
7	Tooth belt	16	Floor guide
8	Electrical emergency unit (option)	17	Programme selector
9	Cable inlet		

7 Space required

Frame doors by others



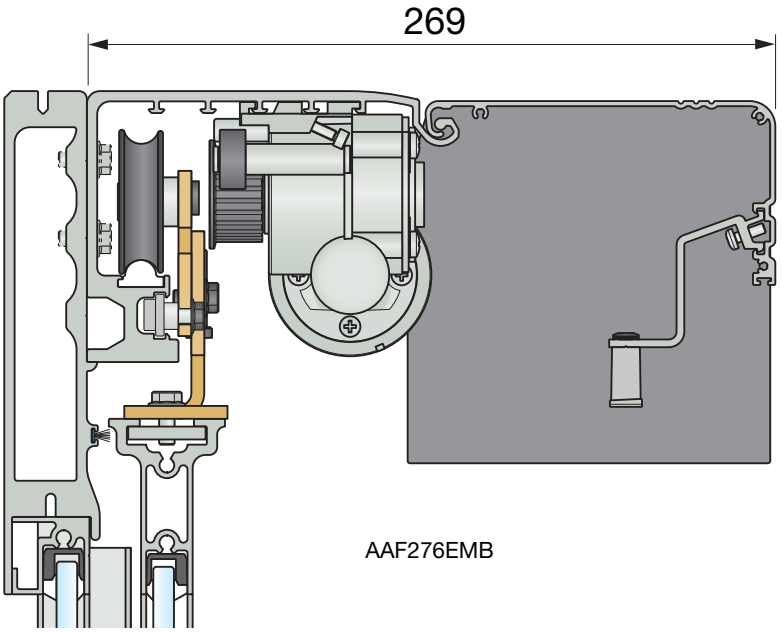
EMPS System



COH = Clear opening height

DH = Door height (**incl. door adapter**)

FFL = Finished floor level



8 Mechanical installation

8.1 Checking

Check that the fixing material and the upper part of the door leaf have the necessary reinforcements and that the floor is level and smooth.

The beam/wall used to fix the support beam must be flat and smooth. If necessary use Entrematic mounting spacers behind the support beam to keep its straightness.

Fixing material	Minimum requirements
Steel	5 mm*
Aluminium	6 mm*
Reinforced concrete	Min. 50 mm from the underside
Wood	50 mm
Brick wall	Expansion shell bolt, min. M6x85, UPAT PSEA B10/25 min. 50 mm from the underside

*Thinner wall profiles must be reinforced with rivnuts

Tools required

- Set of metric box spanners and wrenches
- Spirit level
- Taper rule
- Power drill and set of drill bits, Hammer drill
- Screw driver Torx (T10 and T20)
- Small flat blade screw driver for wire connection
- Screw driver for adjustment of potentiometers
- Centre punch
- Wire stripper
- Plumb bob
- Cable strap tightener

8.2 Installation examples

8.2.1 Bi-parting doors

During installation the support beam is placed so that its centre line is aligned with the centre of the of the daylight width. This ensures that the support beam will be fixed symmetrically over the daylight width. See also Installation of support beam, on page 15.

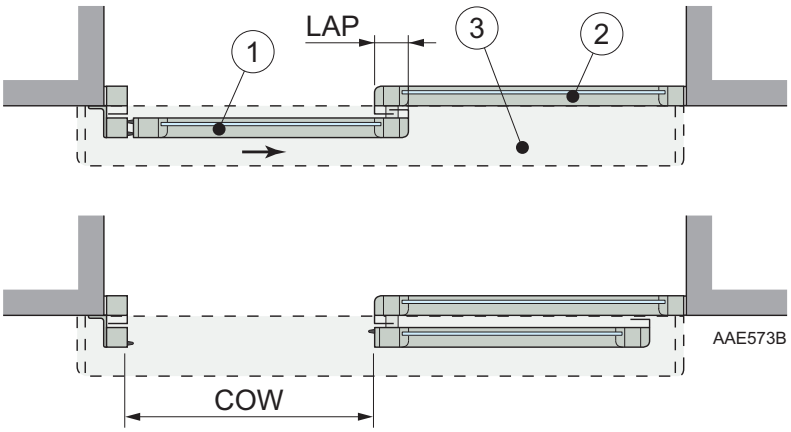
8.2.2 Single sliding doors

See also Installation of support beam, on page 15.

Recommended installation

To reduce the risk of finger traps the jamb is used as door stop for closing and labyrinth sealings are used between door leaf and fixed screen. The door leaf can be open fully and aligns with the fixed screen.

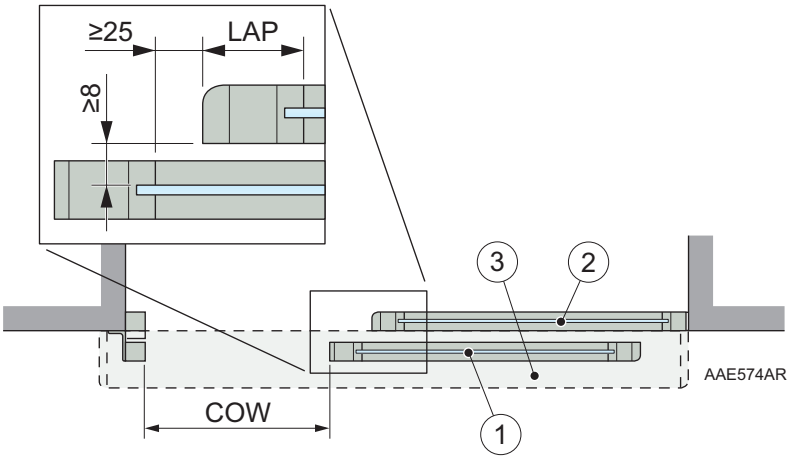
1 Door leaf
2 Fixed screen
3 Operator
COW = Clear opening width
LAP = Overlap (profile width)



Alternative installation of door system (by others)

If the distance measured between the glass pane of the door leaf and the profile of the fixed screen exceeds 8 mm, the recommended installation above is not allowed by authorities in some countries owing to the risk of finger trap. To avoid this, the leading edge of the door leaf must not pass the mullion of the fixed screen but stop at least 25 mm before, see page 23.

1 Door leaf
2 Fixed screen
3 Operator
COW = Clear opening width
LAP = Overlap (profile width)



8.3 Installation of support beam

Marking and fixing

To determine the installation height from the **highest point** of the finished floor:

a Measure the door leaf height **inclusive door adapter**.

b Add **108 mm** or **113 mm** if break-out unit PSB with 8 mm surface mounted threshold/floor guide track is installed. (See also separate installation drawings for EMPS, and Installation and Service Manual for PSB.)

c Mark the installation height on the wall as determined under items 1 and 2.

d Mark for two holes 100 mm to the left and right of the support beam centre line.

e Drill the two holes, tap or plug and apply a screw in the left hole (key hole).

f Remove the cover, see page 25.

g Hang up the support beam in the keyhole and apply another screw in the round hole 200 mm to the right.

h Make sure that **the support beam is level** and tighten the key hole screw.

i Compensate for possible sag at the ends of the beam and mark the fixing holes to be used.

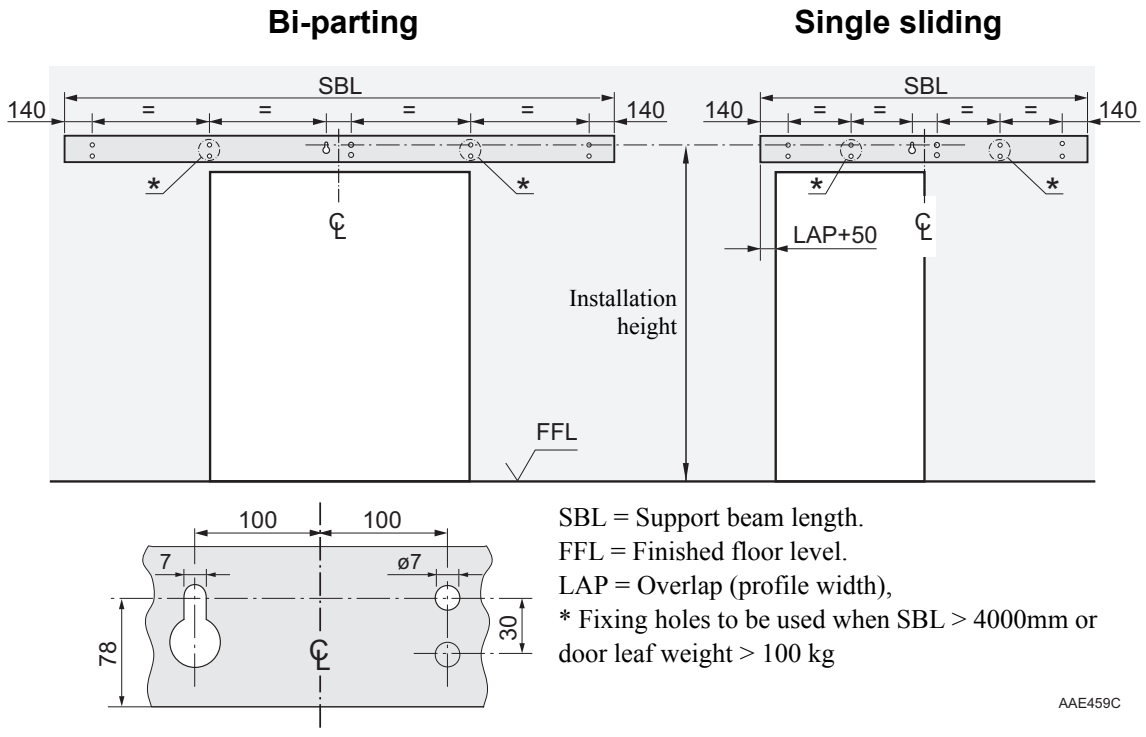
j Tilt or remove the support beam.

k Drill the holes, tap or plug them.

l If the wall is uneven, compensate by hanging Entrematic spacers around the bolts before they are tightened.

m Fix the support beam using bolts.

Note! The height of the bolt head must not exceed 6.5 mm.



SBL = Support beam length.
FFL = Finished floor level.
LAP = Overlap (profile width),
* Fixing holes to be used when SBL > 4000mm or door leaf weight > 100 kg

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8.4 Installing the door adapter on top of the door leaf (frame doors by others)

For **Entrematic doors** the door adapters and door fittings are factory-mounted, proceed to page 18, Hanging the door leaves.

a If necessary cut the door adapter to correspond with the door leaf width.

b Make sure that the upper part of the door leaf is sufficiently reinforced.

c Establish the “Y” distance between the door leaf and the fixed screen/wall, considering door design and draught excluders.

d Place the door adapter on top of the door leaf. The distance “Y” serves to ensure the correct depth installation.

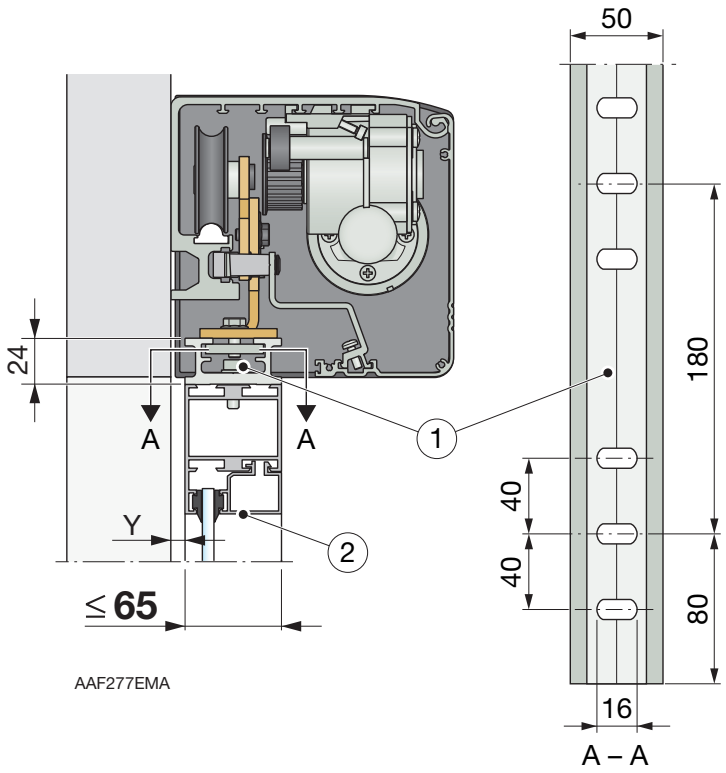
e Mark on the door leaf after the pre-drilled slotted holes. One slotted hole in each group of three has to be used as the attachment carries the whole weight of the door leaf.

f Drill and thread for M6 or use self-tapping screws (Taptite) in the door leaf.

g The door adapter can be roughly adjusted for depth, ± 5 mm, in relation to the door leaf. This rough adjustment is to be carried out when the door adapter is fitted on the door leaf.

h Tighten the door adapter.

If a break-out unit is to be installed, a special break-out adaptor has to be ordered and then cut to size. See separate Installation and Service Manual for PSB.



1 Door adapter (standard)

2 Door leaf

8.5 Installing the carriage wheel fittings on the door adapter

Assemble and install the carriage wheel fittings on the door adapter as shown in the illustration below.

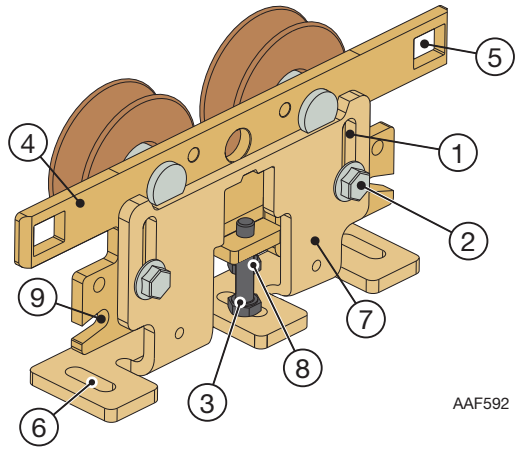
Installation

a Adjust the vertical adjustment screw (3) to the lowest position.

b Fasten one carriage wheel fitting 40 mm from the trailing edge of door leaf.

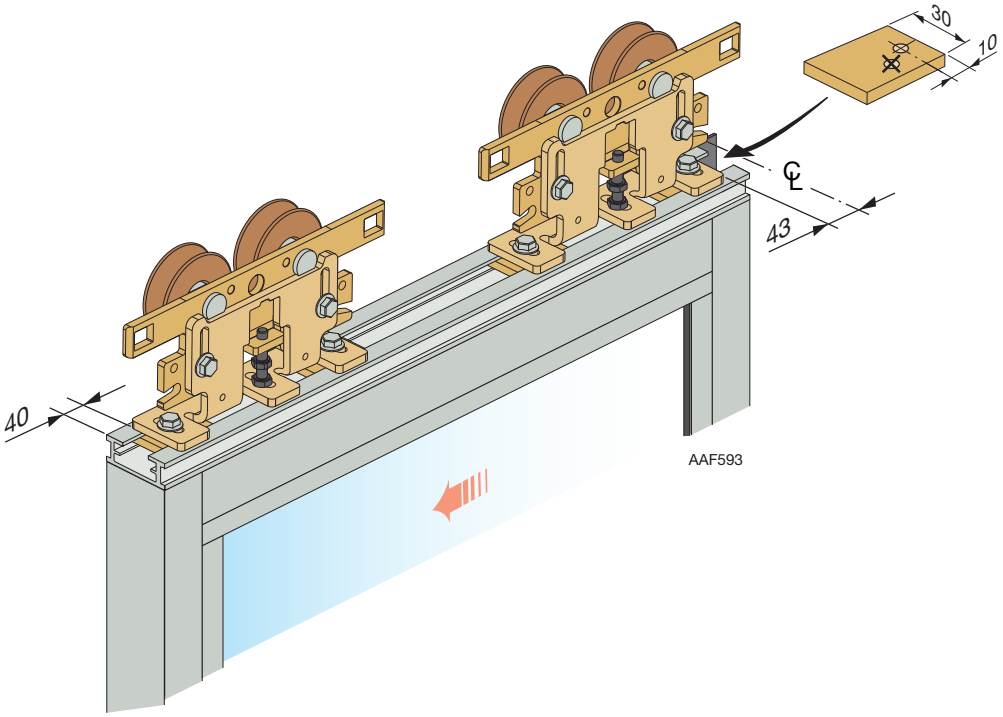
c Fasten the other carriage wheel fitting 43 mm from the leading edge of the door leaf (measured from the estimated centre line with the leaves in closed position).

Note! Make sure that the carriage wheel fittings are completely in line with the door adapter.



Carriage wheel fitting

1 Slotted hole for vertical adjustment
2 Fastening screw
3 Vertical adjustment screw
4 Wheel fitting
5 Square hole for lock hook and for fixing the tooth belt fitting
6 Slotted hole for depth adjustment
7 Carriage fitting
8 Lock nut
9 Slot for anti-derailing device



8.6 Hanging the door leaves

A rough adjustment of the door height is necessary to facilitate the installation of the floor guide.

a Ensure that the sliding track (1) in the support beam is clean.

b Loosen the fastening screws (2).

c Raise the door leaf and place it **carefully** over the floor guide (5).

d Lean the door leaves against the wall and lift the wheel fittings over the sliding track.

e Adjust with the adjustment screw (3) until the door leaf is about 8 mm above the floor (adjustment range ±10 mm).

f Tighten the fastening screws (2) and thereafter the adjustment screw (3). To **secure** the assembly tighten the lock nut (6).

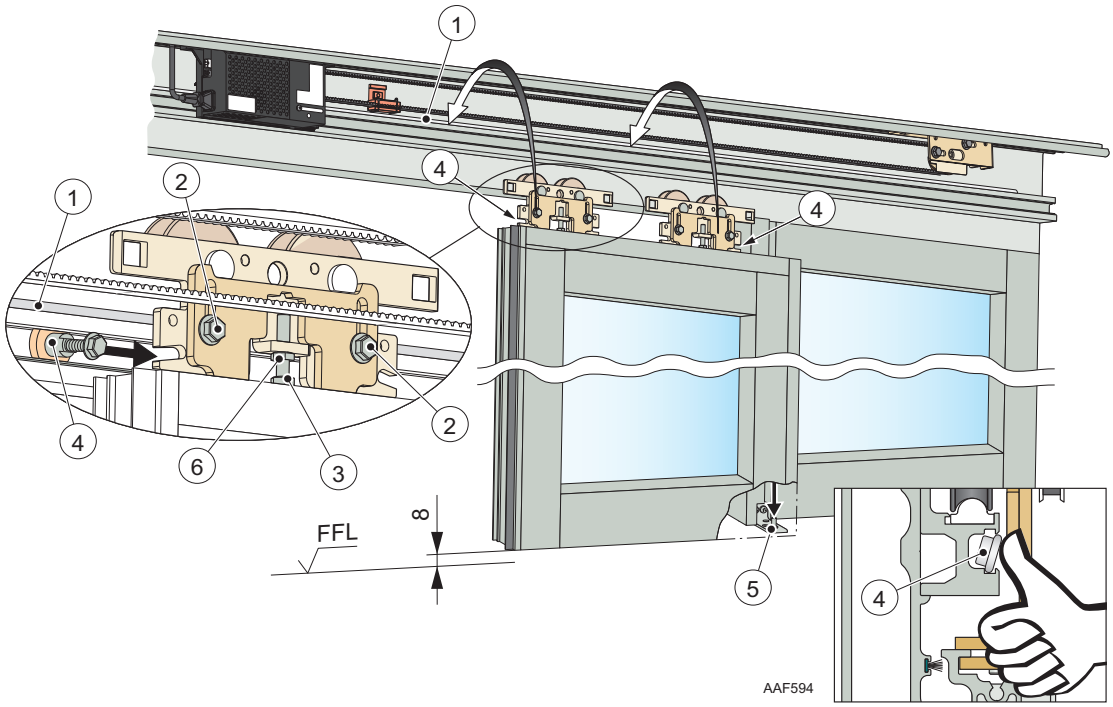
g The anti-derailing device (4) consists of plastic wheel sleeve and screw.

h Press the enclosed plastic wheels, with the thumb, into the slot in the support beam (see illustration).

i Apply the sleeve with screw in the plastic wheel and slide into the outer slotted fastening holes in the carriage wheel fittings (one in each fitting). Adjust horizontally to avoid jamming and tighten the screws firmly.

Note! All carriage wheel fittings should be adjusted in the same way.

See also Height adjustment (final check), on page 21.



1 Sliding track
2 Fastening screw
3 Height adjustment screw
4 Anti-derailing device
5 Floor guide
6 Lock nut

8.7 Installation of Entrematic floor guides (frame doors by others)

The floor guides can be adjusted depthwise about ± 4 mm after being installed, using the eccentric nut underneath the plastic block.

Before installing the floor guide make sure that the plastic block is adjusted to the middle position to ensure full adjustability (±4 mm).

Installation

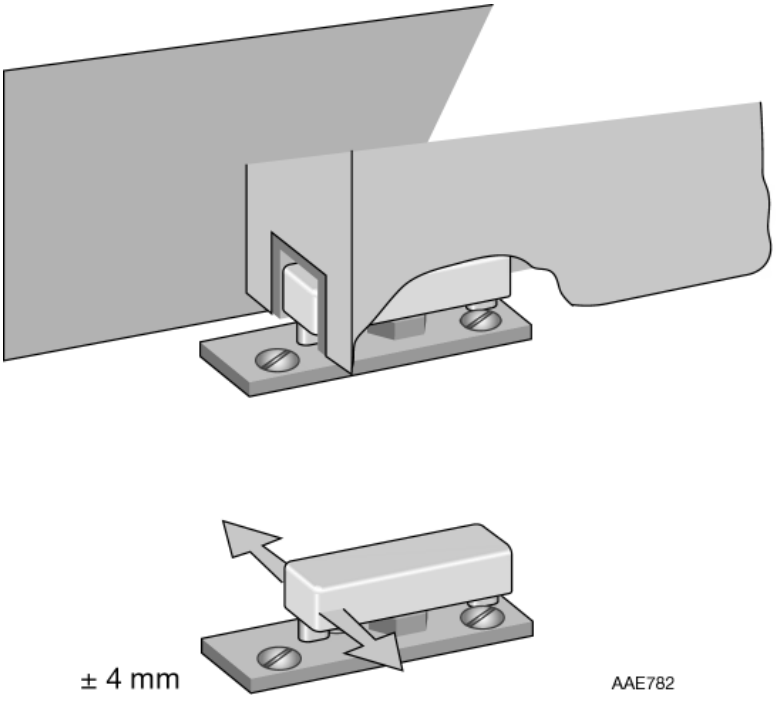
a **Bi-parting doors**
Push the doors together and slide them until their meeting point is aligned with the centre of the opening.
Single sliding doors
Slide the door leaf to closed position.

b Fit the floor guide so that the **plastic block** is in line with the **trailing edge** of the door leaf when in the **closed** position as shown in the illustration below, and depth wise in accordance with the instructions and illustrations on “Frame doors by others” on page 23.

c Mark the position for the floor guide.

d Push the door leaf sideways to clear the space.

e Mark, drill and plug the three holes and fasten the floor guide.



8.8 Final adjustment of the door leaves

A final adjustment of the door leaves are necessary after floor guide installation.

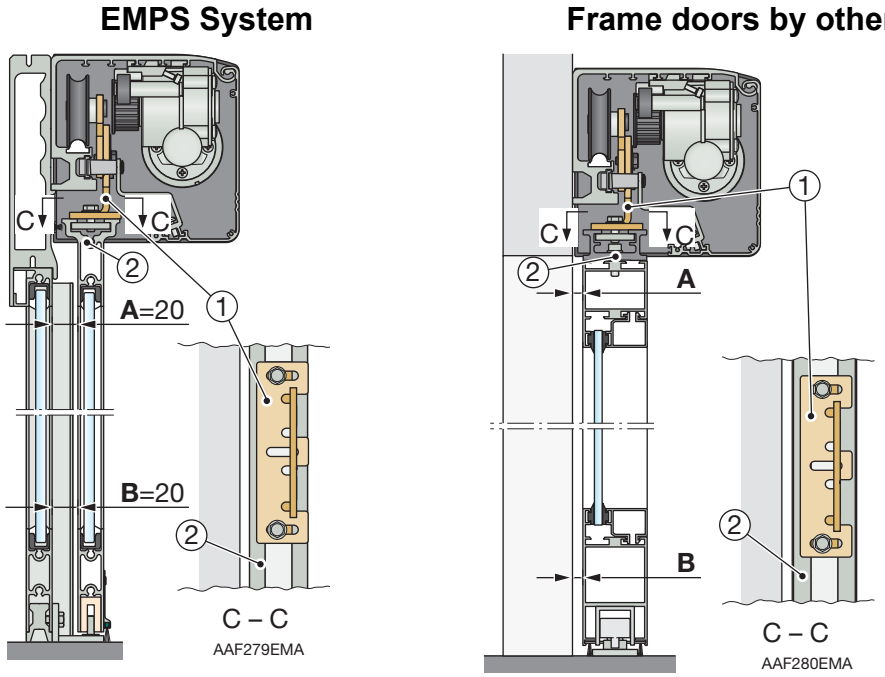
8.8.1 Depth adjustment

a The distance **A**, between the top of the door leaf and the fixed screen, is to be adjusted by loosening the two screws connecting the carriage wheel fitting to the door adapter.
The holes in the carriage wheel fitting are slotted and the door leaf/adapter can be adjusted ±7 mm.
The distance **A** shall be 20 mm for EMPS System.
For frame doors made by others the distance **A** depends on the door leaf thickness and draught excluders. When a draught excluder is used between the door leaf and the fixed screen, it should seal equally for the total vertical height.

Note! Make sure that the carriage wheel fitting is completely in line with the door adapter.

Note! The carriage fittings 1 are turned 180°.

b The distance **B** shall be equal to **A**. With Entrematic floor guide on frame doors made by others, the distance **B** can be adjusted ± 4 mm with the eccentric nut on the floor guide.



1 Carriage fitting

2 Door adapter (integrated in the door leaf for EMPS)

8.8.2 Height adjustment (final check)

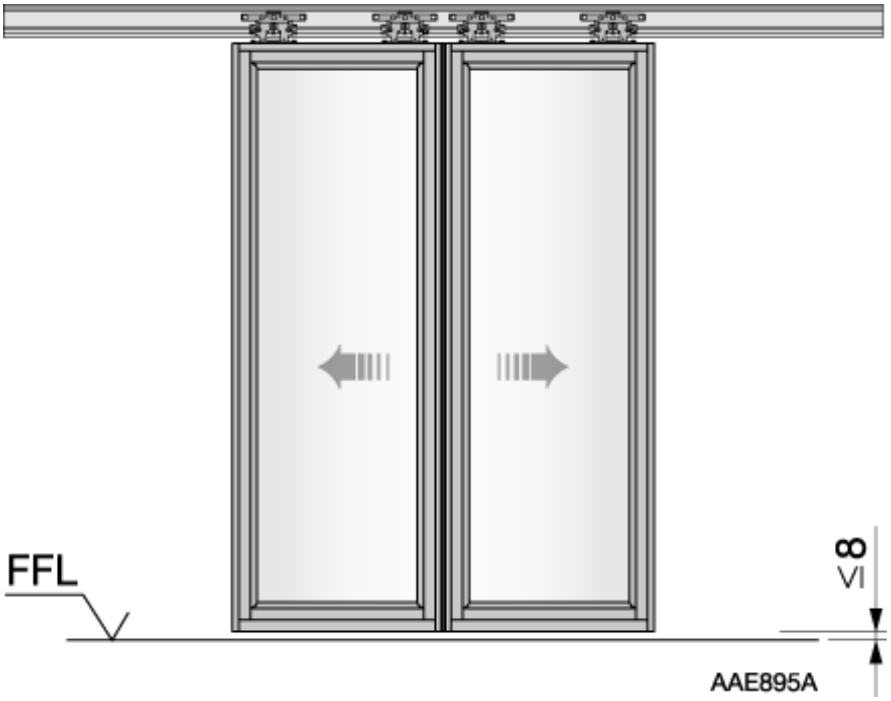
The height adjustment is to be carried out with the vertical adjustment screw 3 as described in Hanging the door leaves on page 18.

a It is very important that the door leaf hangs vertically after the adjustment and that bi-parting doors are parallel to one another in the closed position (no gap at the top or bottom).

b The floor guide should not touch the upper surface of the door guide track.

c If a draught excluder is used on the lower edge of the door leaf, it should only lightly touch the floor.

d Check that all door leaves and fixed screens are parallel.



FFL = Finished floor level

8.9 Attachment of tooth belt fittings

The tooth belt fitting joining the belt ends is factory-mounted to the lower part of the tooth belt.

Single sliding operators

a Pull the tooth belt until the tooth belt fitting is just opposite the right square hole in the left carriage wheel fitting.

b Fasten the tooth belt fitting to the carriage wheel fitting using the enclosed flanged screw.

Bi-parting operators

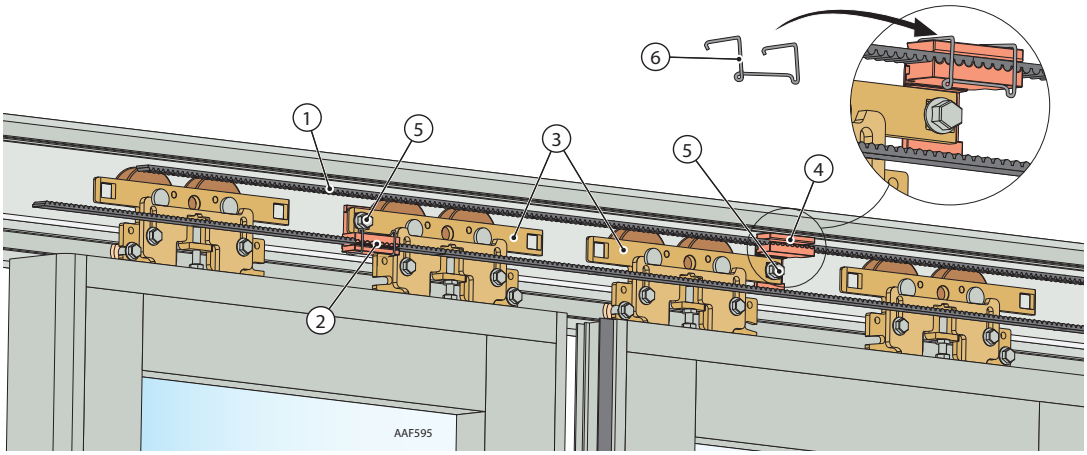
a Push the doors together and slide them until their meeting point is aligned with the centre of the opening. **Make sure the door leaves do not change position during installation.**

b Pull the tooth belt until the lower tooth belt fitting is just opposite the left square hole in carriage wheel fitting at the leading edge of the left door leaf.

c Fasten the tooth belt fitting to the carriage wheel fitting with the enclosed flanged screw.

d Apply the enclosed tooth belt fitting to the right square hole in the carriage wheel fitting at the leading edge of the right door leaf using the enclosed flanged screw.

e Attach the tooth belt fitting to the upper part of the belt and lock it with the enclosed belt securing clip.



1 Tooth belt
2 Tooth belt fitting, left door leaf
3 Carriage wheel fitting
4 Tooth belt fitting, right door leaf
5 Flanged screw
6 Belt securing clip

8.10 Adjustment of the leading edge

a Push the doors by hand to desired opening.

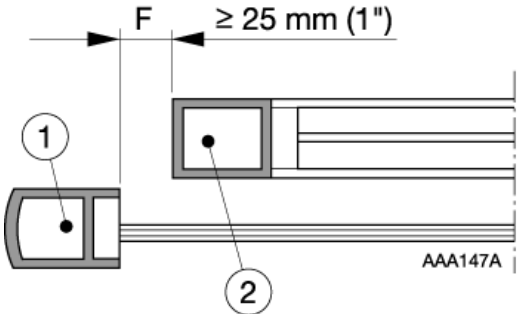
Note! In case of frame doors made by others, the leading edge of the door leaf must not pass the mullion of the fixed screen but stop at least 25 mm before to avoid finger trap.

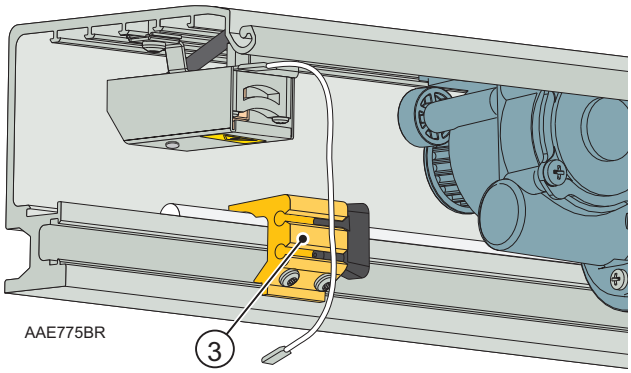
b Loosen the door stops, move them against the carriage wheel fittings and tighten firmly.

c Fasten the plastic sliding track with the screw on top of the right door stop.

d Check that required opening and finger protection (if any) are achieved. Entrematic EMPS systems are designed to give finger protection without consideration to the safety distance F.

Frame doors by others





F = Safety distance (finger protection frame doors by others)

1 Door leaf

2 Fixed screen

3 Door stop

8.11 Checking and adjusting the belt tension

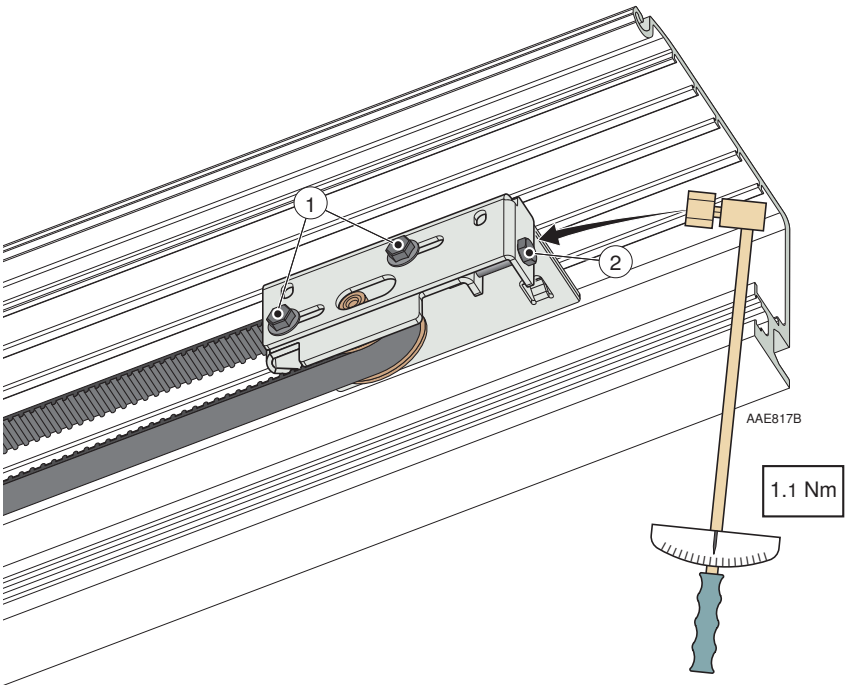
The belt tension is factory-adjusted and readjustment is normally not needed.

If despite this, the belt tension has to be corrected, proceed as follows:

a Loosen the two fixing screws (1).

b Tighten the belt adjustment screw (2), M6, to a torque of 1.1 Nm ±0.1 Nm.

c Tighten the two fixing screws (1).



8.12 Installing/Removing the cover

Two pre-mounted rotary-locks in each end of the cover fit into a slot in the support beam. By turning the locks clockwise the cover is secured.

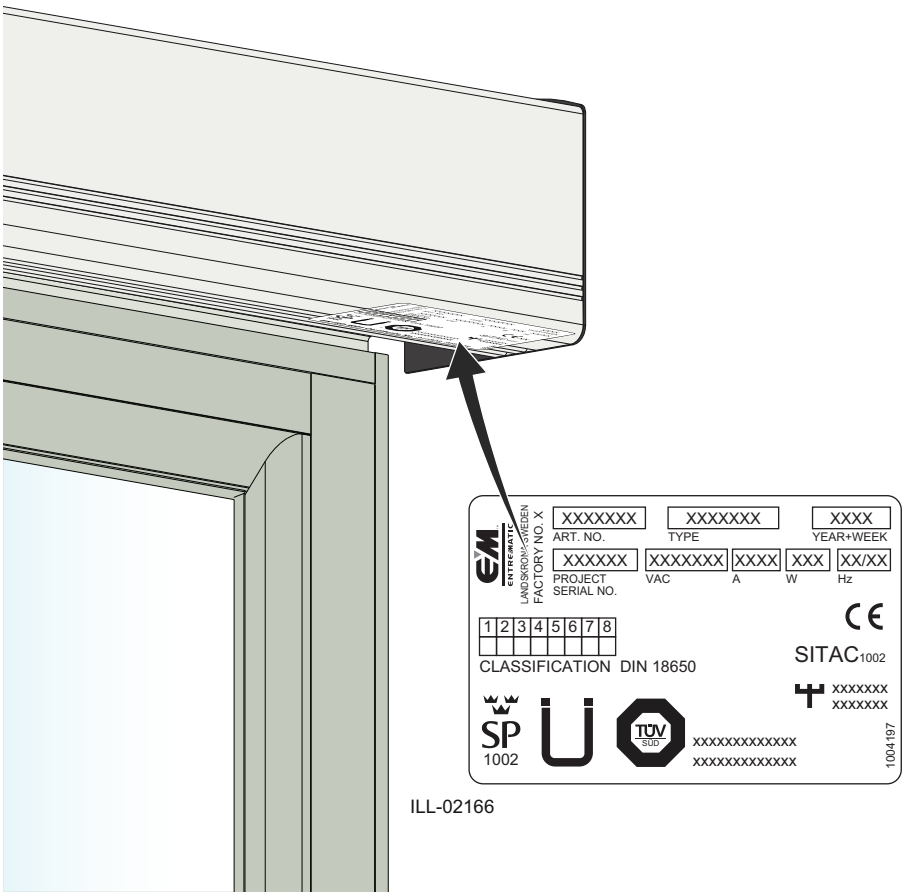
Installing

a The rotary-locks are rectangular. Make sure they are turned “horizontally”.

b Fit the upper part of the cover into the hinge and place the cover support tool (optional) into the beam, to keep the cover open.

c
- Connect the protective earth cable coming from the mains power connection box to the cover, see page 34.
- Fix the cover support block with enclosed self-tapping screws in the centre of the cover. If an electromechanical lock is installed in the middle, move the block 100 mm in any direction.
- If the electrical connections are not terminated proceed to page 28.

d When properly installed and adjusted, attach the product label, which includes the CE mark on the right side of the lower part of the operator cover (see illustration).

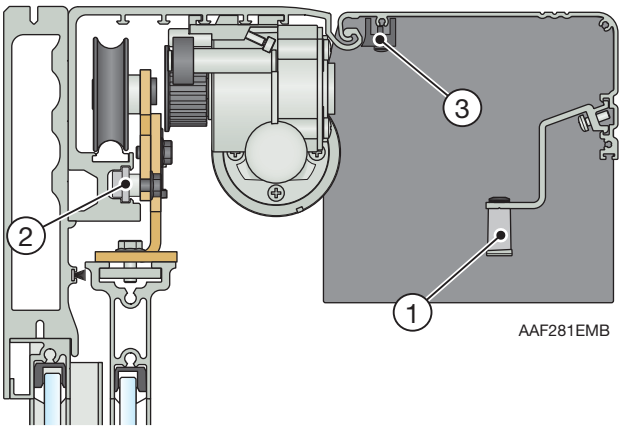


ILL-02166

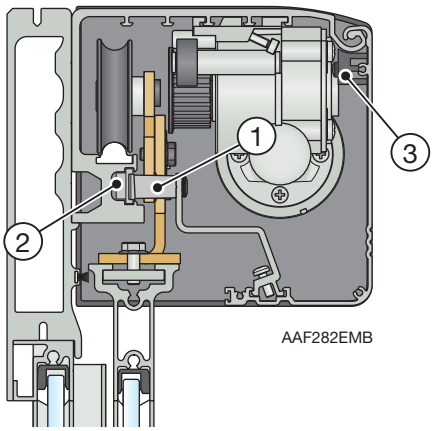
e Remove the cover support tool and close the cover.

f Make sure the rotary-locks fit into the slot. Fasten the cover by inserting a 10 mm standard wrench from the underside and turn the rotary-locks clockwise (approx. 90°).

Removing is carried out in reverse order



AAF281EMB



AAF282EMB

1 Rotary lock

2 Slot in the support beam

3 Cover support block

9 Electrical connections

Note!

During any work with the electrical connections the

- **mains power** and the
- **electrical emergency unit must be disconnected**.

Installation

a Open the cover, see page 25.

b Install extension unit EXU-4 or EXU-3 if required, see page 34.

c Install and connect the mains cables, see below.

d Carry out Start-up, see page 36.

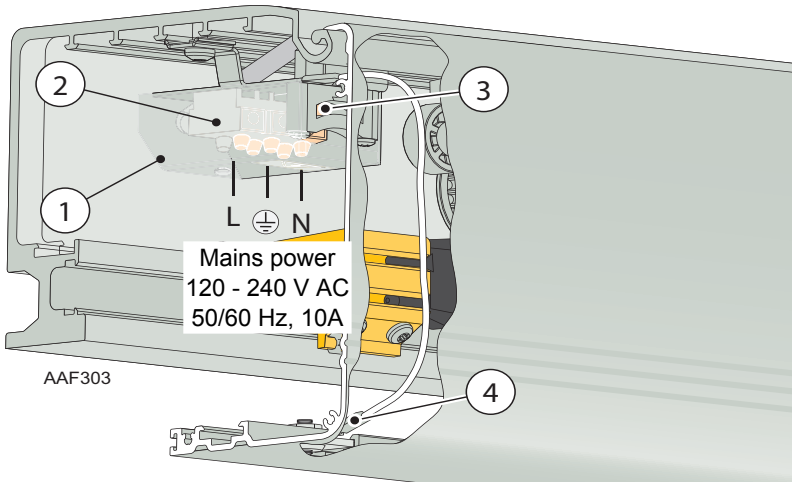
Mains connection

a Unscrew the fastening screw and remove the protective lid.

b Connect the incoming mains power through the strain relief to the connection block as shown in the illustration below.

c Connect the protective earth to the cover.

d Put the protective lid back in place.

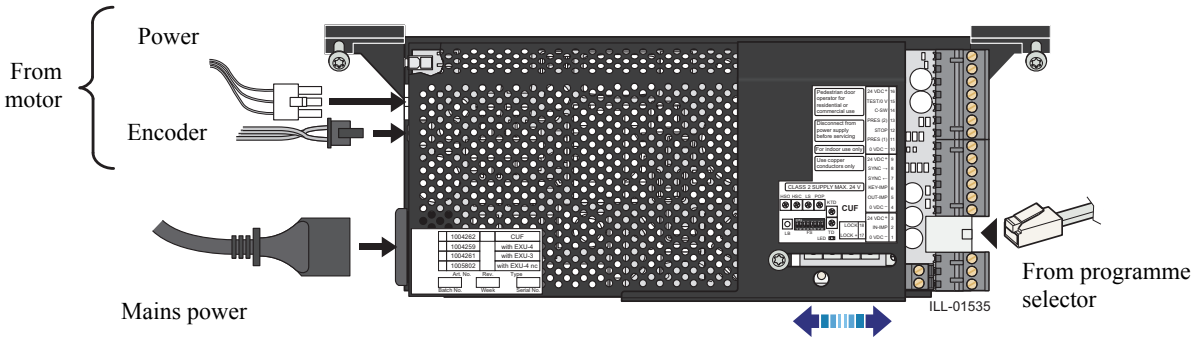


1 Protective lid
2 Mains connection block
3 Strain relief
4 Protective earth for the cover

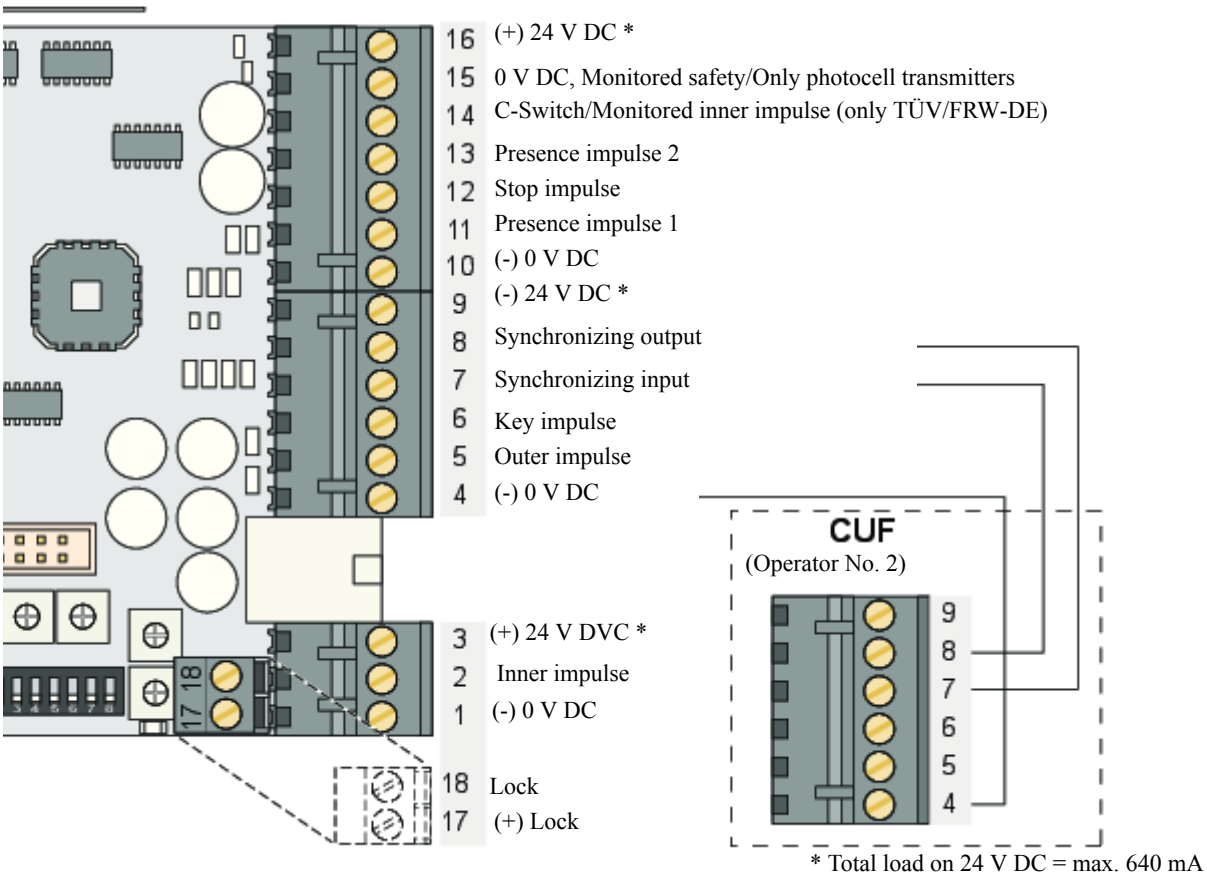
9.1 Control unit

The control unit is equipped with:

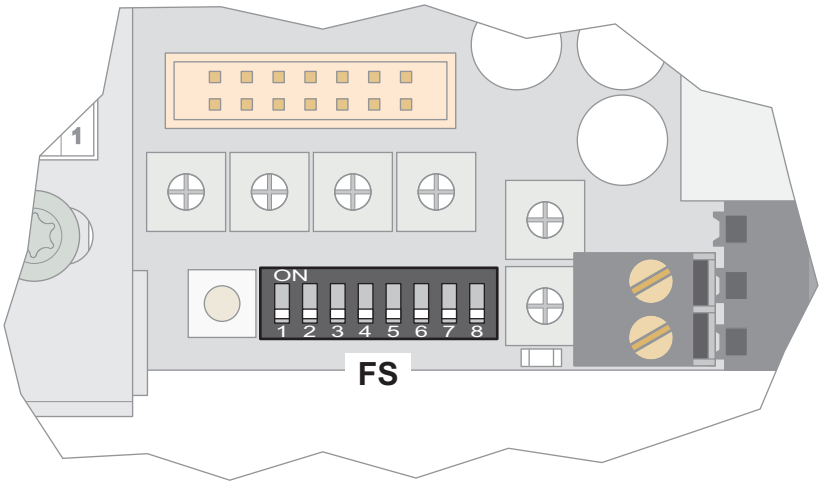
9.1.1 Contacts for connection of standard units



9.1.2 Terminal block for connection of accessories



9.1.3 Function selector, FS, used to select special operating functions

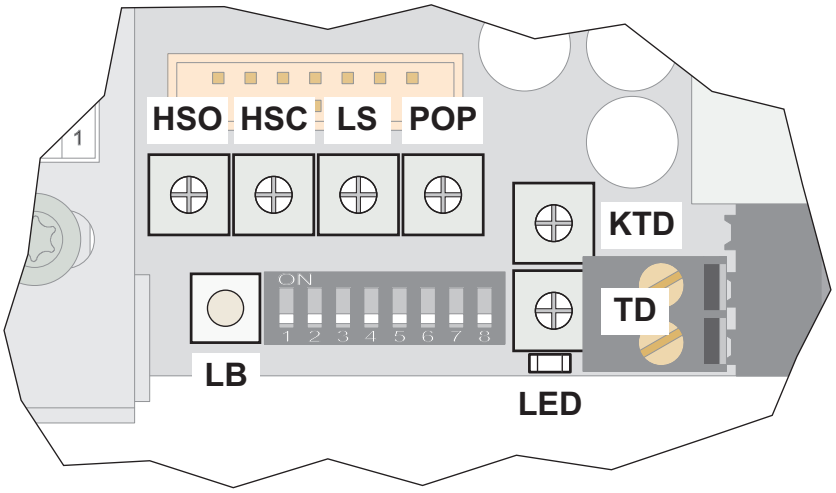


The function selector switches are factory set to OFF.

Function selector (FS)		OFF	ON
1	Motor direction of rotation [CCW = bi-parting and single sliding, left opening] [CW = single sliding, right opening]	CCW	CW
2	Lock type (locked with/without power)	With	Without
3	Lock release [To be set to ON if electric lock is installed]	No	Yes
4	Presence detection type (normally open/closed) [Applies in common for the terminals 11, 12 and 13 on the control unit CUF and terminal 4 on the EXU-4]	NO	NC
5	Emergency unit type [To be set to OFF if no emergency unit is installed]	Electrical	Mechanical
6	Emergency unit monitoring [To be set in accordance with local authority require-ments]	No	Yes
7	Sensor monitoring [To be set in accordance with local authority require-ments]	No	Yes
8	Hold force on closed door (0 N / 45 N) [Setting ON always recommended]	No	Yes

Note! Press the LEARN BUTTON briefly after any FS adjustment to ensure proper configuration.

9.1.4 Potentiometers and LEARN BUTTON

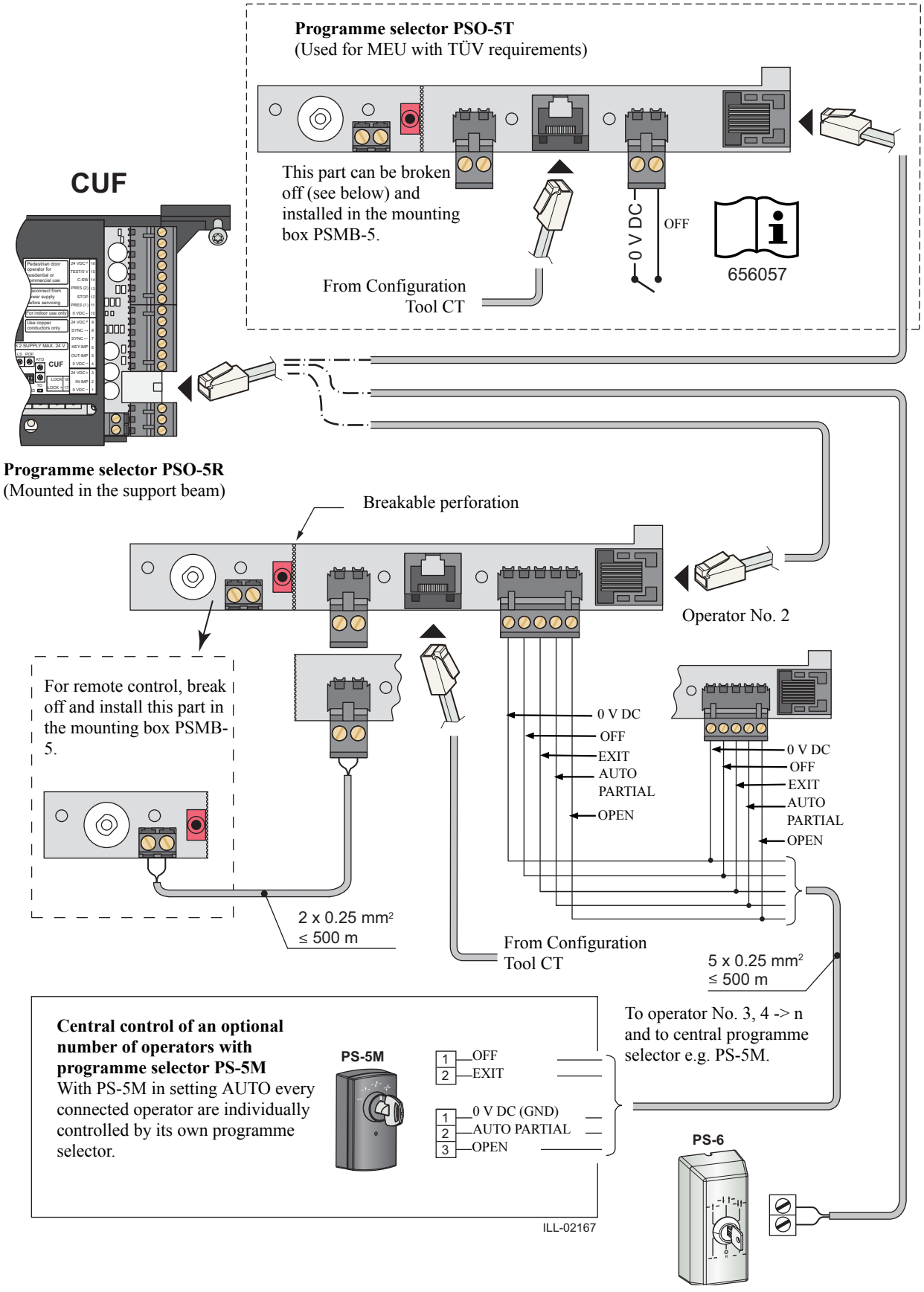


The potentiometers are factory set to approx. 50% of the adjustment range.

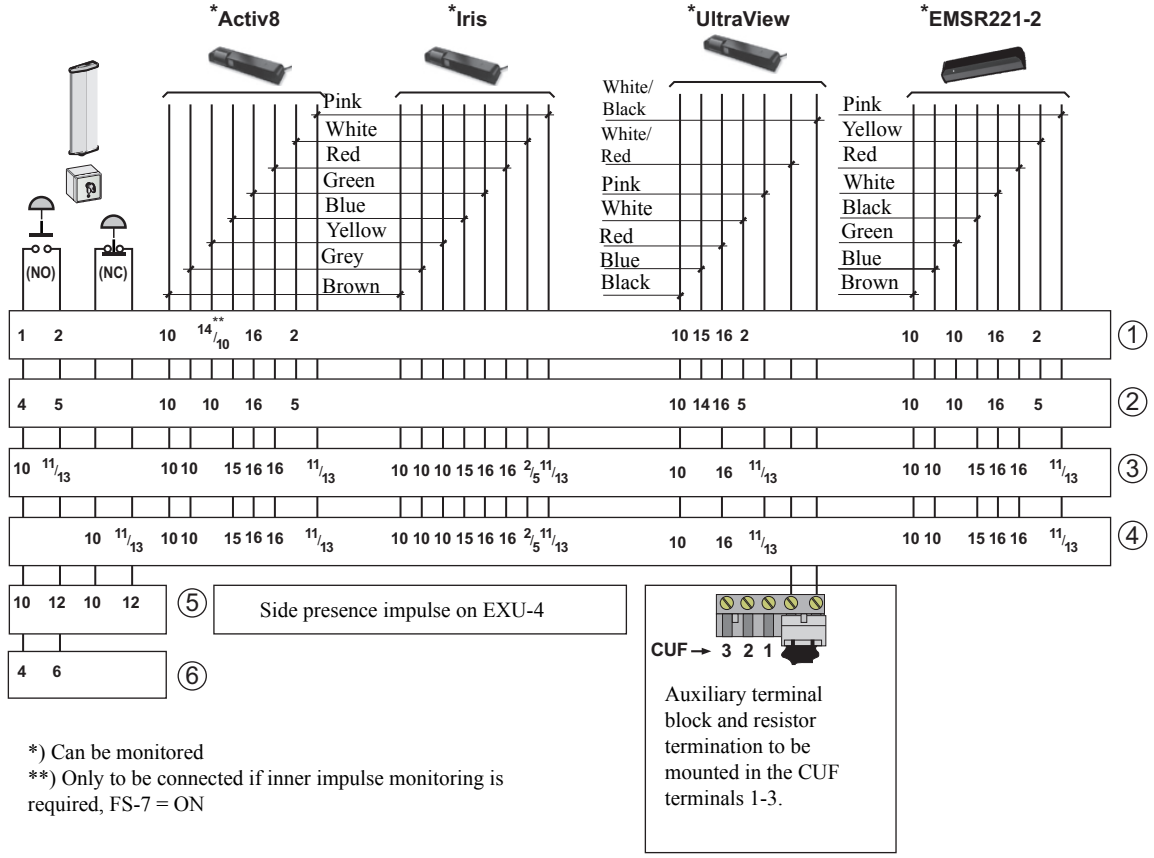
Parameter		Range
HSO:	HIGH SPEED OPENING	0.10 – 0.70 m/s
HSC:	HIGH SPEED CLOSING	0.10 – 0.70 m/s
LS:	LOW SPEED	0.05 – 0.70 m/s
POP:	PARTIAL OPENING POSITION	0 – 100%
KTD:	KEY HOLD OPEN TIME	0 – 60s
TD:	HOLD OPEN TIME	0 – 60 s
LB:	LEARN BUTTON	See page 36
LED:	ERROR INDICATION	See page 40

Note! Press the LEARN BUTTON briefly after any potentiometer adjustment, to use the new configuration. The speed applies to single sliding operator.

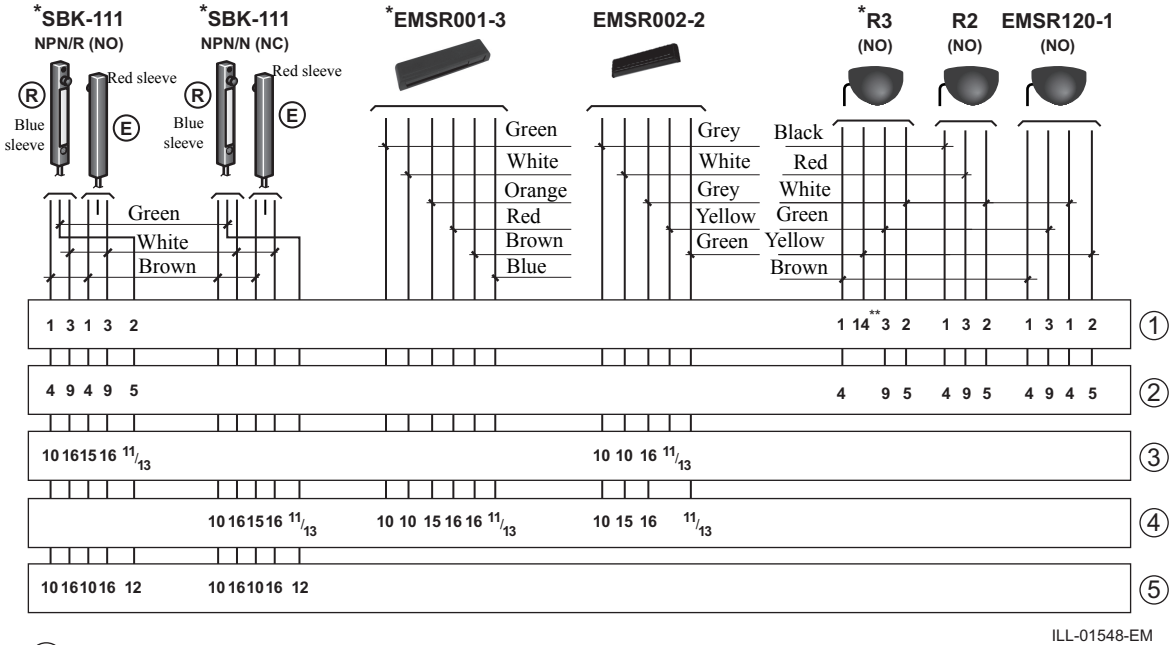
9.1.5 Connection of programme selectors


Programme selector PSO-5T
(Used for MEU with TÜV requirements)
This part can be broken off (see below) and installed in the mounting box PSMB-5.
0 V DC
OFF
From Configuration Tool CT
656057
CUF
Programme selector PSO-5R
(Mounted in the support beam)
Breakable perforation
Operator No. 2
For remote control, break off and install this part in the mounting box PSMB-5.
0 V DC
OFF
EXIT
AUTO PARTIAL
OPEN
2 x 0.25 mm²
≤ 500 m
From Configuration Tool CT
5 x 0.25 mm²
≤ 500 m
To operator No. 3, 4 -> n and to central programme selector e.g. PS-5M.
Central control of an optional number of operators with programme selector PS-5M
With PS-5M in setting AUTO every connected operator are individually controlled by its own programme selector.
PS-5M
1 OFF
2 EXIT
1 0 V DC (GND)
2 AUTO PARTIAL
3 OPEN
PS-6
ILL-02167

9.1.6 Connection of activation units



*) Can be monitored
**) Only to be connected if inner impulse monitoring is required, FS-7 = ON



ILL-01548-EM

(1) Inner impulse

(2) Outer impulse

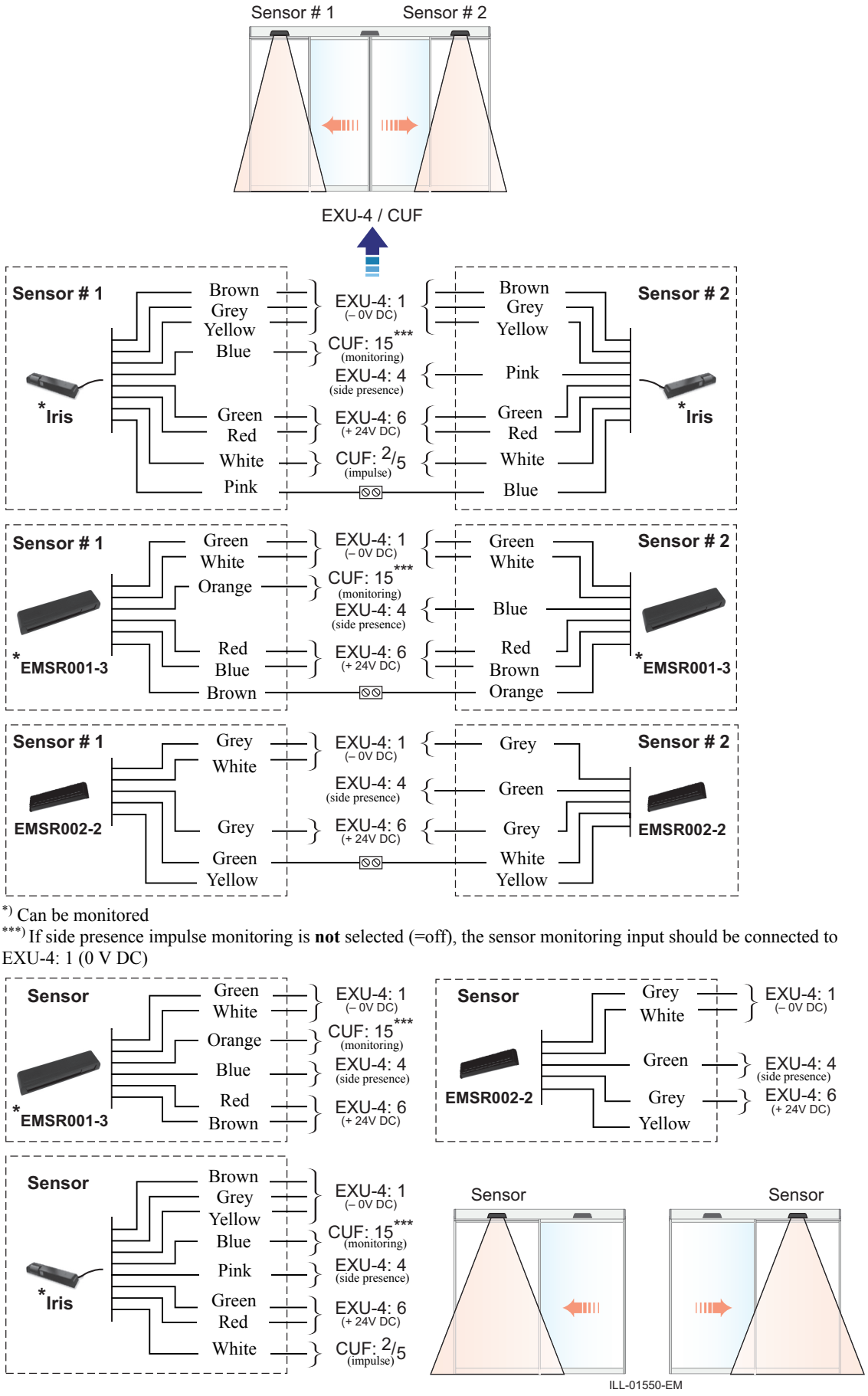
(3) Presence impulse, NO

(4) Presence impulse, NC

(5) Stop impulse

(6) Key impulse / (Emergency open impulse, EEU required)

9.1.7 Side presence sensors



*) Can be monitored

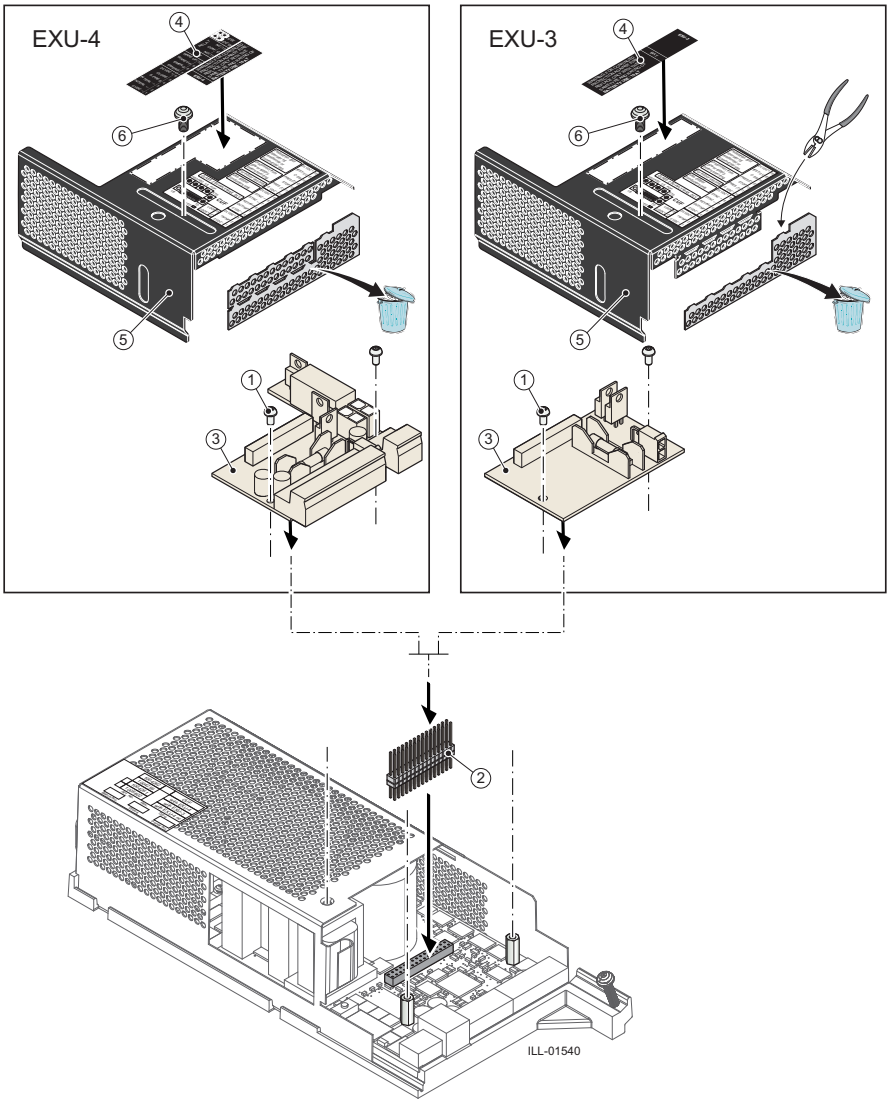
***) If side presence impulse monitoring is **not** selected (=off), the sensor monitoring input should be connected to EXU-4: 1 (0 V DC)

9.2 Extension units

When functions beyond those implemented on the main control unit are required, two extension units are available, EXU-4 and EXU-3. These units are to be applied on top of the control unit (if not factory installed).

Note! When installing or replacing an extension unit the LEARN BUTTON LB must be pushed for a minimum of 2 seconds.

9.2.1 Fitting the extension units EXU-4 or EXU-3 to the control unit CUF



1 Fastening screws (2 pcs)

2 Tagstrip (long pins to be fitted into the EXU)

3 Extension unit, EXU-4 or EXU-3

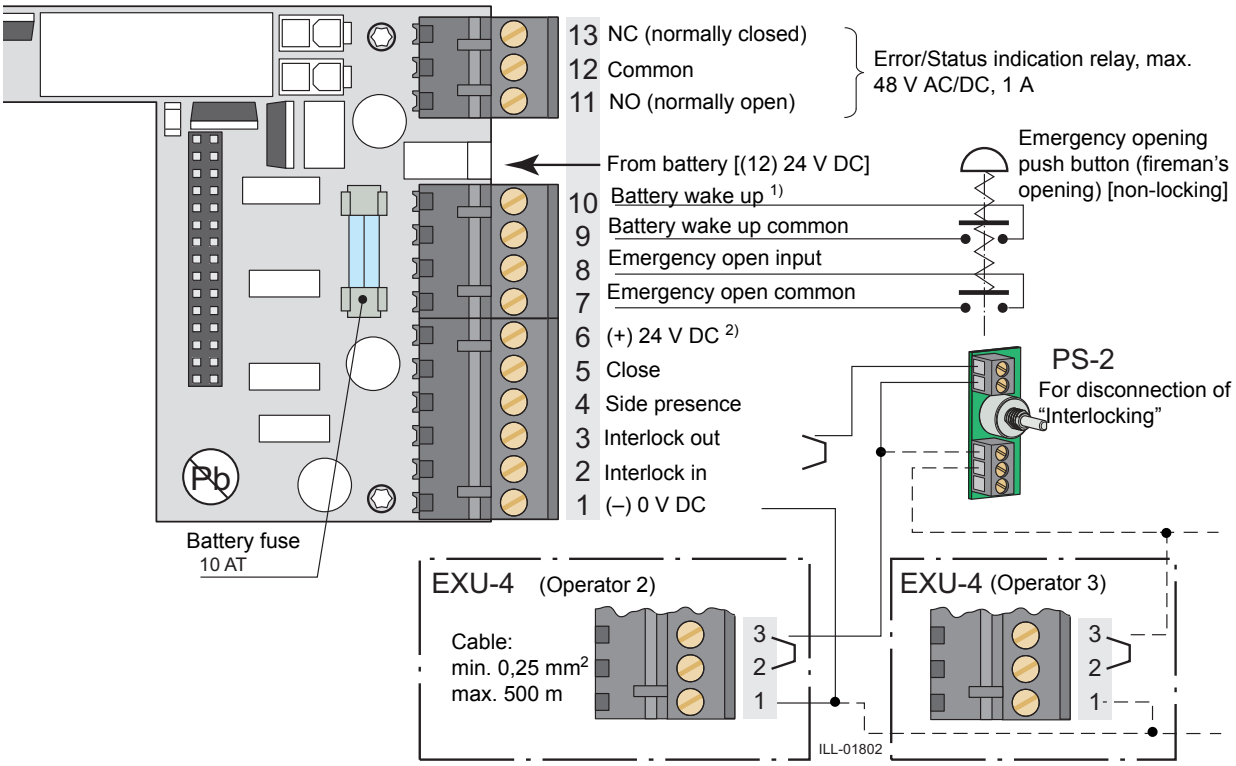
4 Label (EXU-4 or EXU-3)

5 Lid

6 Screw for fixing the lid

9.2.2 Extension unit, EXU-4

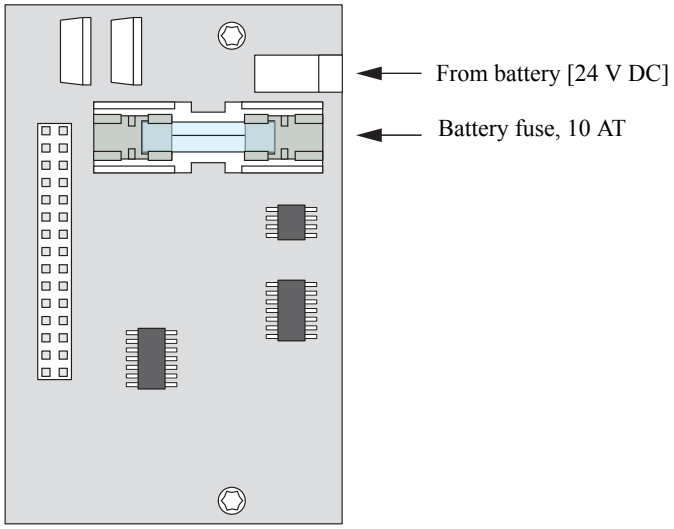
Following functions can be obtained with this unit:



1) Connects the battery in absence of main power
2) Total load on all 24 V DC, max. 640 mA

9.2.3 Extension unit, EXU-3

This extension unit has the functions **electrical emergency unit** or **convenience battery**. The battery cable is to be connected to the EXU-3.



10 Start-up

After installing the operator, the START-UP and adjustment must be carried out in the following order (see also Electrical connections on page 27).

a Remove the mains power plug from the control unit CUF.

b Connect the mains power cables to the connection block.

c Make sure that FS-1 (direction of rotation) and FS-2 (locked with or without power) are correctly set.

d Unplug the programme selector. Unplug all activation units and presence sensors, terminals 1-16.

e Put the door in half open position. Apply the mains power plug to the control unit CUF and push the LEARN BUTTON LB for minimum 2 seconds. The door will now carry out a complete OPEN/CLOSE cycle at low speed to learn the opening width and the closed position. When finished, check that the door is closed.

Note! The LEARN BUTTON LB has different functions:

- Push LB briefly and adjusted potentiometer and/or function selector FS settings will be accepted. A battery will also be detected, if connected.
- If the LB is pushed for a minimum of 2 seconds, the operator will carry out a complete OPEN/CLOSE cycle at low speed to learn the opening width and the closed position and also detect an eventual extension unit.

f To check the door movement, give opening impulse by strapping the terminals No. 1 and 2 on the control unit CUF.

g Remove the mains power plug from the CUF and install activation units, presence sensors, programme selector and accessories.

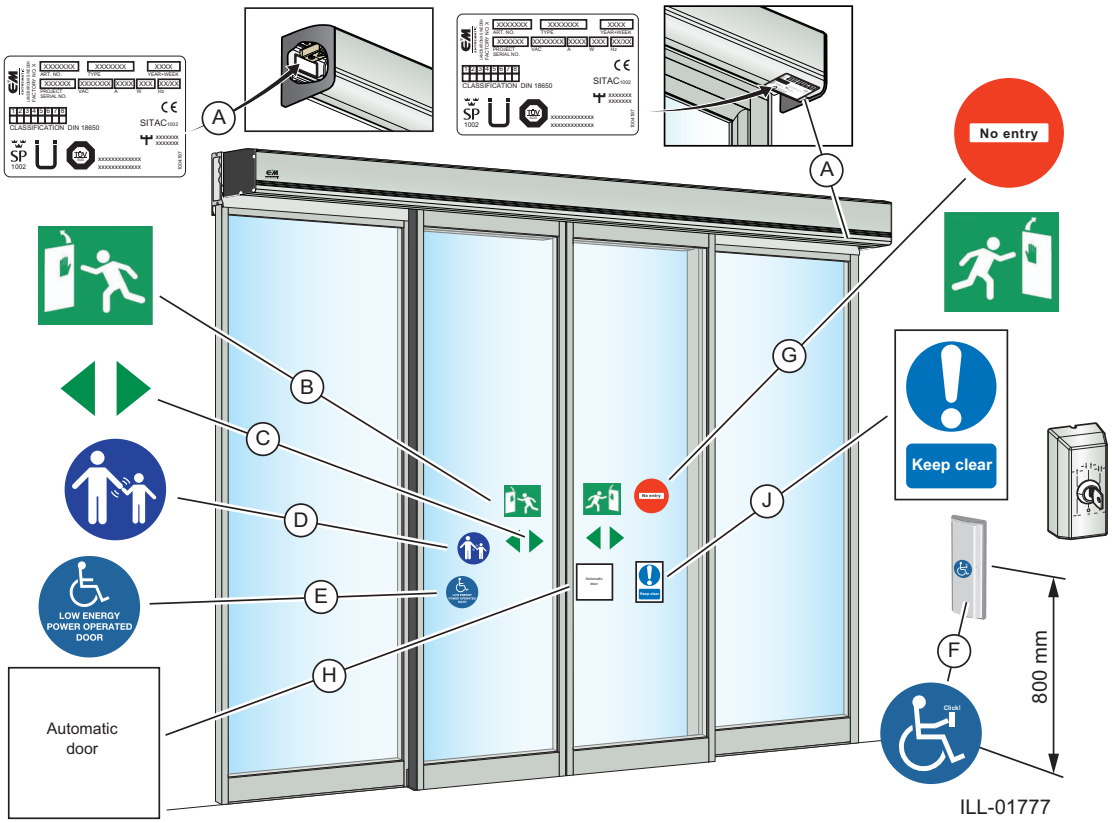
h Select correct functions with the function selector FS, for the connected accessories.

i Apply the mains power plug to the CUF, push shortly the LEARN BUTTON LB.
If necessary, adjust the door speeds and sensor detection field values to meet the specific application and regulation requirements.

Note! The LOW SPEED is self adjusting to optimal operation if the LOW SPEED potentiometer is set to max. Depending on authority or installation requirements the LOW SPEED can be further reduced.

Note! Press the LEARN BUTTON briefly after any FS or potentiometer adjustment to ensure proper configuration. Further parameters can be adjusted by using the Configuration Tool, CT. See separate manual.

11 Signage



Check that all required signage is applied and intact. Mandatory indicates that the signage is required by European directives and equivalent national legislation outside the European Union.

Ⓐ	Product label: Mandatory
Ⓑ	Emergency break-out: Mandatory, if approved for escape route.
Ⓒ	Entrematic door sticker: Mandatory according to European directives and equivalent national legislation outside the European Union, to highlight the presence of the glass.
Ⓓ	Supervision of child: Mandatory, if applicable (applied to both sides of the door). To be placed on entrances where the risk analysis shows use by children, elderly and disabled.
Ⓔ	Operator designed for disabled people: Recommended, if applicable (applied to both sides of the door)
Ⓕ	Activation by disabled people: Recommended, if applicable
Ⓖ	No entry, identifying one-way traffic: Mandatory in GB and US, if applicable
Ⓗ	Automatic door: Only mandatory in GB
Ⓙ	Keep clear: Only mandatory in GB

12 Programme selectors and functions

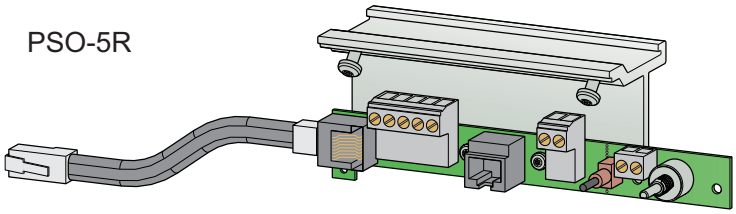
12.1 Operation

The functions of the door are set with key programme selectors. The key must always be removed on emergency escape doors after changing settings.

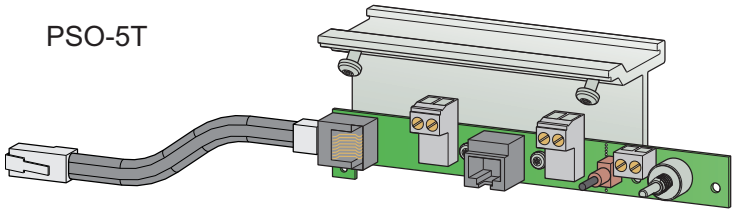
- PSO-5R, can be fully remote-controlled by PS-5M.
- PSO-5T, can be remote-controlled, day/night by PS-2, used for MEU.
- PSMB-5, mounting box, flush or surface mounted on the side screen or on the wall close to the door.
- PS-5M, flush or surface mounted, for central control of an optional number of operators. In setting AUTO every connected operator are individually controlled by its own programme selector.
- PS-6, surface mounted on the side screen or on the wall close to the door.

Mounted in the operator

PSO-5R



PSO-5T

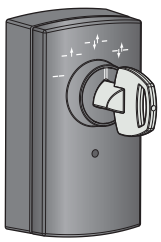


Flush mounted

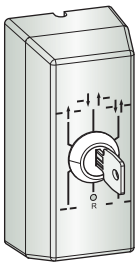
PSMB-5
PS-5M

Surface mounted

PSMB-5
PS-5M



PS-6



12.2 Programme selector functions

OFF

This function is only used on emergency escape doors after it is certain that all people have left the building.
The door cannot be opened with inner and outer activation units. The door is locked if an electromechanical locking device has been fitted. The door can be opened partially with a key switch (if fitted). With an emergency push-button (if fitted) the door opens fully.

EXIT

Passage from inside only. The door is normally locked if an electromechanical locking device has been fitted. The door can only be opened with the inner activation unit or with a key switch/emergency push-button (if fitted).

AUTO

Two-way traffic, normal operation of the door. The door can be opened with the inner and outer activation units and with a key switch/emergency push-button (if fitted).

AUTO PARTIAL

Two-way traffic, AUTO PARTIAL is obtained. The door can be opened partially with the inner and outer activation units and with a key switch (if fitted). With an emergency push-button the door opens fully.

OPEN

The door is permanently open. The door can be moved by hand e.g. for window cleaning. All activation units except for the emergency push button (if fitted) are disconnected.

RESET

Set the programme selector to AUTO. Insert a narrow object in the small hole on the programme selector and push briefly. The operator makes a system test of the emergency unit (if selected), electromechanical lock, watchdog relay and closed door position. The operator is after closing reset and ready for normal operation.

Note! The RESET is not available on programme selector PS-5M.

RESET

Turn the key clockwise to the position “R” (six o’clock) and insert a narrow object in the small hole on the programme selector and push briefly. Then turn the key counter-clockwise back to the requested setting. The operator makes a system test of the emergency unit (if selected), electromechanical lock, watchdog relay and closed door position. The operator is after closing reset and ready for normal operation.

Note! The key cannot be removed in the "R" position.

Note! If monitored emergency unit is a demand, a test of the emergency unit is performed when the programme selector is turned from OFF or OPEN to any other position.

13 Troubleshooting

Before starting the troubleshooting, check that the programme selector setting is correct and then RESET the operator. Start the troubleshooting by checking the mechanical and electrical parts of the operator in the following order.

The control unit, emergency unit and electromechanical lock are fixed with brackets in the support beam. To replace, the complete unit is to be loosened and replaced.

13.1 Mechanical checking and remedies

Disconnect the mains power. Unlock all mechanical locks. Pull the door leaf manually and check that the door can be easily moved over the complete sliding track/floor guide. If the door leaf stops or is hard to move, the reason may be sand, stones, rubbish etc. in the floor guide. The door leaf may also be jamming on the floor or on the draught excluders. Clean the floor guide, adjust the door leaf height/depth or take other necessary measures e.g. replacement of wear parts until the door leaf is running smoothly when manually operated.

13.2 LED indication and CT Error codes

The control unit is equipped with a light emitting diode LED for error indication. By means of the configuration tool CT, a more detailed error description (CT error codes) can be obtained. See also separate manual for CT.

13.2.1 Normal operation/Non-critical errors

During normal operation and for non-critical errors the LED on the control unit is illuminated.

13.2.2 Power failure (no error code)

If the LED is extinguished check the mains power, power supply cable and perform a RESET. If the problem remains replace the control unit.

13.2.3 LED indication

- **Sensor error**
  1 fast flash (0,2s), pause (1,0s) etc.

- **Emergency Unit error**
  2 fast flashes (0,4s), pause (1,0s) etc.

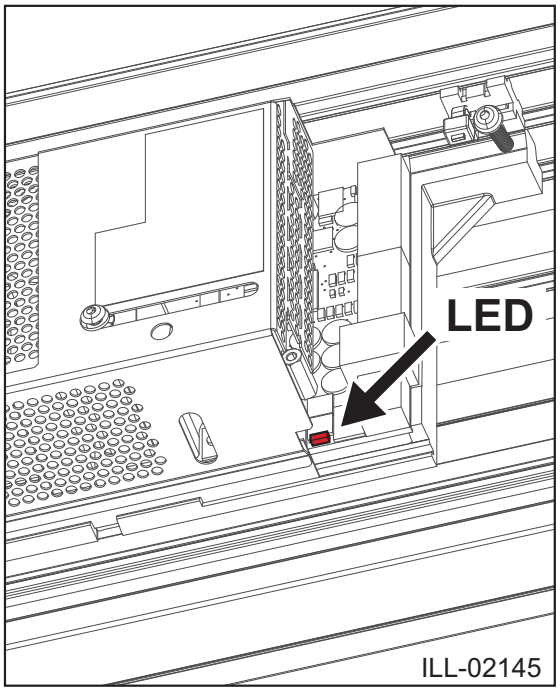
- **CUF error**
  3 fast flashes (0,6s), pause (1,0s) etc.

- **Motor/Encoder error**
  4 fast flashes (0,8s), pause (1,0s) etc.

- **Lock error**
  5 fast flashes (1,0s), pause (1,0s) etc.

- **Motor Temperature High**
  1 slow flash (1,8s), pause (0,2s) etc.

- **Normal operation/Non-Critical errors**
  Illuminated



13.2.4 Sensor Error

LED indication: 1 fast flash (0,2s), pause (1,0s), etc.

CT error code	Reason	Remedy
Presence Impulse Error	The control unit doesn't get a test answer, from the activation unit.	Make sure that the monitoring output is connected and the connections are OK.
		Replace the presence activation unit.
Side Presence Impulse Error	The control unit doesn't get a test answer, from the activation unit.	Make sure that the monitoring output is connected and the connections are OK.
		Replace the side presence activation unit.
Inner Impulse Error	The control unit doesn't get a test answer, from the activation unit.	Replace the presence activation unit.
		Adjust sensor field so that the sensor can give a test answer.

13.2.5 Emergency Unit Error

The door is opened and stays open

LED indication: 2 fast flashes (0,4s), pause (1,0s), etc.

CT error code	Reason	Remedy
Emergency Action Timeout	The door is prevented from fulfilling its emergency unit test within a stated time, due to broken or weak rubber band, high friction or jammed door.	Check rubber band tension and make sure that the door can open to fully open position.
Emergency Unit Error	The battery voltage drops due to low capacity.	Charge or replace battery.
	The battery voltage measurement is wrong.	Replace the EXU-4 extension unit.
Battery Error	The battery is disconnected or short-circuited.	Make sure that the cables are OK and connected.
		Check the battery fuse.
		Charge or replace battery.

13.2.6 CUF error

LED indication: 3 fast flashes (0,6s), pause (1,0s), etc.

CT error code	Reason	Remedy
RAM Error	Internal RAM memory error.	RESET, and if the problem remains, replace the control unit.
ROM Error	Internal ROM memory error.	RESET, and if the problem remains, replace the control unit.
EEPROM Error	Serious internal EEPROM memory error.	RESET
		Download a saved parameter set or DEFAULT parameter set and perform a RESET. If the problem remains, replace the control unit.
EEPROM Critical Write Error	Internal write EEPROM memory error. This error mainly occurs when it's impossible to change a configuration parameter.	RESET
		Try to change the configuration parameter that caused the problem, and if the problem remains, replace the control unit.
SMPS Over Voltage	The internal link voltage has for some reason increased to above 47 V.	RESET, and if the problem remains, replace the control unit.
A/D Converter Error	The internal A/D Converter or multiplexer is broken.	RESET, and if the problem remains, replace the control unit.
Lock Circuit Error	It is not possible to disconnect the lock with the lock relay.	RESET, and if the problem remains, replace the control unit.
Hardware Watchdog Error	It is not possible to disable the motor bridge.	RESET, and if the problem remains, replace the control unit.
Output Enable Error	Test of safety related circuits failing.	RESET, and if the problem remains, replace the control unit.
Register Error	Internal register error.	RESET, and if the problem remains, replace the control unit.
OS Error	Internal program error.	RESET, and if the problem remains, replace the control unit.
Flash Code Error	Serious internal programming error.	Replace the control unit.
Link Voltage Error	The internal link voltage measurement is wrong.	RESET, and if the problem remains, replace the control unit.

13.2.7 Motor / Encoder error

The motor and lock power are disconnected.

LED indication: 4 fast flashes (0,8s), pause (1,0s), etc.

CT error code	Reason	Remedy
Encoder Error	The encoder, encoder cable, or Motor cable is damaged.	Make sure that the encoder cable and the motor cable are connected.
	Wrong Motor type is selected.	Check Motor Type configuration with the CT-Tool.
Motor Current Error	The Motor cable or Encoder cable is damaged.	Make sure that the encoder cable and the motor cable are connected.
	Wrong Motor type is selected.	Check Motor Type configuration with the CT-Tool.
Encoder Cable Error	The encoder cable is damaged.	Make sure that the encoder cable is connected.

13.2.8 Lock error

The motor and lock power are disconnected.

LED indication: 5 fast flashes (1,0s), pause (1,0s), etc.

CT error code	Reason	Remedy
Lock Failure	The lock or something else was preventing the door from opening the first 14 mm from closed position.	Make sure that the lock is operating without friction.
		Make sure that HOLD FORCE and LOCK RELEASE are set correctly.

13.2.9 Motor Temperature High

The door is opened and stays open.

LED indication: 1 slow flash (1,8s), pause (0,2s), etc.

CT error code	Reason	Remedy
Motor Temperature High	The duty cycle of the door is too high for the current speed settings and HOLD OPEN TIME.	If the motor is warm, put the door in PS OPEN and wait for at least 1 minute. Reduce speeds and increase HOLD OPEN TIME.
	The heavy-duty motor is replaced with a normal duty motor.	Put the door in PS OPEN and wait for at least 5 minutes.

Note! This error is not removable by RESET, only by setting the door in programme selection OPEN with the power on.

13.2.10 Non-Critical errors

These errors don't influence the door operation but are logged in the error log, and can only be displayed by means of the CT-Tool.

LED indication: Illuminated

CT error code	Reason	Remedy
Communication Error	The cable to the CT-Tool was removed before performing DISCONNECT from the CT-Tool.	Connect the CT-Tool and DISCONNECT from the CT-Tool before removing the cable.
EEPROM Access Error	The EEPROM queue is full.	Too many events to log in the event log. Reduce the number of events to log in the event log configuration.
EEPROM Non-critical Write Error	The control unit cannot write error log, event log, or service log information to the EEPROM memory.	RESET, and if the problem remains, replace the control unit if it is important to read log information.

13.3 After remedy or replacement the operator has to be checked as follows:

a Study the door movement and adjust the functions to the values required for a smooth door operation.

b Check that correct functions and values have been selected for the installed accessories and that the installation complies with valid regulations and requirements from the authorities.

c Clean the cover and the doors.

14 Maintenance/Service

Regular inspections should be made according to national regulations and product documentation by a Entrematic-trained and qualified technician. The number of service occasions should be in accordance with national requirements and product documentation. This is especially important when the installation concerns a fire-approved door or a door with an emergency opening function.

a Remove dust and dirt from the operator. Dirt on the sliding track should be removed with methylated spirits. If necessary replace the sliding track.

b None of the parts need lubrication.

Note! Note! The force for redundant opening with MEU is created with help of elastic cords. The material for these cords may be slowly degraded if exposed to lubricants.

c The tooth belt must be kept dry and clean. Check the belt tension.

d Check that all nuts and bolts are tightened well.

e Adjust, if necessary, the door leaf speed, the HOLD OPEN TIME and the door leaf position to comply with valid regulations and requirements.

f Check that the function of emergency escape units always is operational.

g If an electromechanical lock, LDP (locked with power) or LDB (bi-stable), is installed check the function as follows:

- Set the programme selector to EXIT. The door should open and close without any sound from the lock.
- Set the programme selector to OFF. Make sure the door can not be opened by pulling the door leaf in the opening direction.
- When the programme selector is set back to EXIT, two clicking sounds (LDB) or one clicking sound (LDP) indicate that the lock is unlocked. The door should then open and close without any sound from the lock.

14.1 Maintenance plan

The table below shows the recommended interval - in months - when to replace parts during preventive maintenance.

Part	Part number	Cycles/hour in operation			Abusive Environment
		<10	<100	>100	
		Low traffic	Medium traffic	High traffic	
Electrical emergency unit battery	33550475	24	24	24	24
Mechanical emergency unit elastic cord	331700121	12	12	12	12
Floor guide shoe Standard Felt padded Break-out	 33830064 33831622 830792	24	12	6	6
Carriage wheel Double Anti-derailing	 331000525 33550716	36	24	12	12
Sliding track	33701596	48	36	24	12
Tooth belt	33735251	60	48	36	24

Check that all required signage, see page 37, is applied and intact. Also check other consumable parts, such as brushes, door stops and glazing rubbers.

15 Accessories

15.1 Safety accessories

Even though the EMSL is installed to comply with all applicable safety regulations, it is possible to enhance safety/comfort with the following add-ons (please contact your local Entrematic company for detailed description).

- Combined motion and presence sensors
- Separate presence sensors

15.2 General accessories

Your EMSL can be further improved with the following add-ons (please contact your local Entrematic company for detailed description).

- Cover
  Made in clear anodized aluminium as standard. Paint finished in RAL colours or anodizing optional.
- Motion and presence sensors, see separate manuals or installation drawings.
- Programme selectors, see page 38 and separate installation drawings 656037 and 656058.
- Electrical locks
  Locked with power, locked without power or bistable lock.
  See separate installation drawing 656007.
- Manual unlocking device
  For manual unlocking the electrical lock.
  See separate installation drawing 656017.
- Micro switch kit
  For indication of door and lock position.
  See separate installation drawing 656006.
- Locked door indicator
  For indication of locked lock and closed door for connection to alarm system.
  See separate installation drawing 656084.
- Electrical emergency unit with batteries
  Used if a door is required to be opened or closed by means of a rechargeable battery unit and remain in this position in the event of power failure. Authorities can demand that the emergency unit is monitored on a regular time basis. Half an hour before this time has elapsed the following opening impulse generates an emergency opening test. If there is no opening impulse within an additional time, specified by the authorities, the operator control unit generates the opening impulse itself.
  If the battery opens the door within the limited time the test is successful and the door resumes the function set by the programme selector.

  Note! The test is never performed in programme selector setting OPEN. In setting OFF it can be selected. The test is always performed after a RESET and after changing program selection, from a position where a test is not done to a position where the test is a demand.
- Electrical emergency unit with batteries and two motors
  Used if a door is required to be opened by means of a rechargeable battery unit and remain in this position in the event of power failure. Authorities can demand that the emergency

unit is monitored on a regular time basis. Half an hour before this time has elapsed the following opening impulse generates an emergency opening test. If there is no opening impulse within half an hour, the operator control unit generates the opening impulse itself.
If the battery opens the door within the limited time the test is successful and the door resumes the function set by the programme selector.

Note! The test is never performed in programme selector setting OPEN. In setting OFF it can be selected. The test is always performed after a RESET and after changing program selection, from a position where a test is not done to a position where the test is a demand.

- Emergency closing with repeated closing
  If the door is opened by hand after an electrical emergency closing, it will close again.
  See separate installation drawing 656006.
- Mechanical emergency unit with elastic cord
  Used if a door is required to be opened and remain opened by means of an elastic cord in the event of power failure. Authorities can demand that the emergency unit is monitored on a regular time basis. Half an hour before this time has elapsed the following opening impulse generates an emergency opening test. If there is no opening impulse within half an hour, the operator control unit generates the opening impulse itself.
  If the elastic cord opens the door within the limited time the test is successful and the door resumes the function set by the programme selector.

  Note! The test is never performed in programme selector setting OPEN. In setting OFF it can be selected. The test is always performed after a Reset and after changing program selection, from a position where a test is not done to a position where the test is a demand.
- Break-out unit PSB
  Enables the door/side screens to be broken outwards in case of emergency by applying a defined pressure, see “Emergency Escape” on page 7. See separate installation drawing 1003658.
- Interlocking
  Used between two operators when the first operator must close before the other one can open (typical to reduce energy losses and not for security reasons). EXU-4 required.
- Convenience battery UPS
  Stand-by supply which gives continued operation during short power failure. EXU-3 or EXU-4 required. See separate installation drawing 656056.
- Emergency opening
  Opens the door in any programme selector setting (fireman's opening). EXU-4 required.
- External error indication
  Obtained if a lamp or a buzzer is connected. EXU-4 required.
- Key switches (flush and/or surface mounted)
  Used to give opening impulse to the door in any programme selector setting. With electrical emergency unit also during power failure.
- Push button
  Used to give opening impulse to the door.
  See separate installation drawing 656005.
- Synchronization
  Used between the operators of two single sliding doors, working together in very large openings.

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